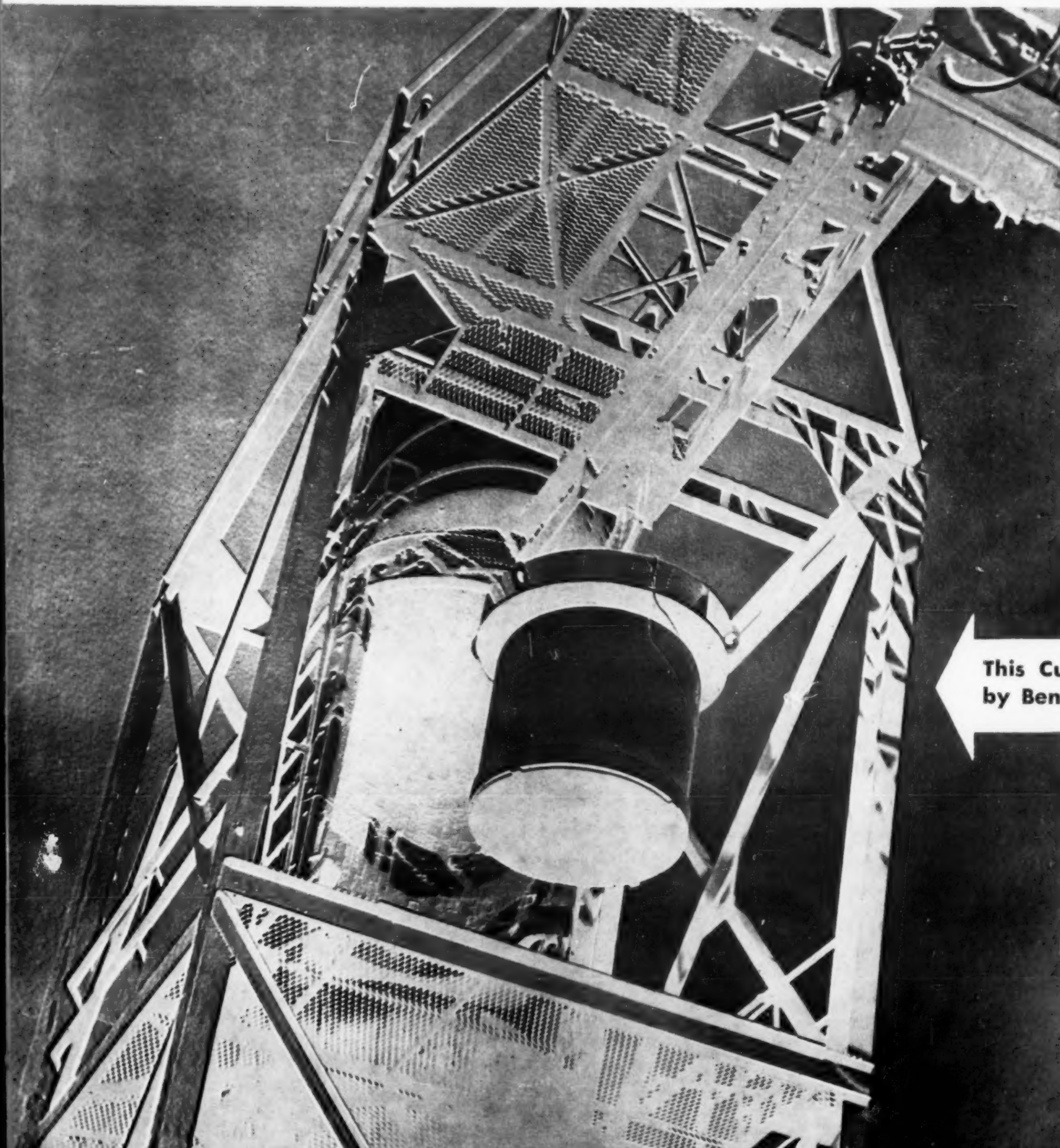
DECEMBER 1958

modern castings



The Foundrymen's Own Magazine

Wood for Patterns

8-page Bonus Section presents AFS tentative standard pattern colors, revised 1958, plus data on selecting wood for patterns.

future meetings and exhibits

DECEMBER

Nov. 30-Dec. 5 . . American Society of Mechanical Engineers, *Annual Meeting*. Statler Hilton and Sheraton-McAlpin Hotels, New York.

3 . . Foundry Facings Manufacturers Association, *Annual Meeting*. Waldorf-Astoria Hotel, New York.

3-5 . . American Institute of Mining, Metallurgical & Petroleum Engineers, *Electric Furnace Steel Conference*. Statler Hotel, Detroit.

3-5 . . National Association of Manufacturers, *Annual Meeting*. Waldorf-Astoria Hotel, New York.

8 . . AFS Nominating Committee, *Annual Meeting*. Sherman Hotel, Chicago.

9 . . Material Handling Institute, *Annual Meeting*, New York.

9 . . AFS Board of Awards, *Annual Meeting*. Union League Club, Chicago.

1959

JANUARY

12-16 . . Society of Automotive Engineers, *Annual Meeting & Engineering Display*. Sheraton-Cadillac and Statler Hotels, Detroit.

26-29 . . *Plant Maintenance & Engineering Show*. Public Auditorium, Cleveland.

FEBRUARY

12-13 . . AFS Wisconsin *Regional Foundry Conference*. Schroeder Hotel, Milwaukee.

15-19 . . American Institute of Mining, Metallurgical & Petroleum Engineers, *Annual Meeting*. San Francisco.

18-19 . . Malleable Founders' Society, *Technical & Operating Conference*. Wade Park Manor, Cleveland.

26-27 . . AFS *Southeastern Regional Foundry Conference*. Hotel Tutwiler, Birmingham, Ala.

MARCH

9-10 . . Steel Founders' Society of America, *Annual Meeting*. Drake Hotel, Chicago.

13-14 . . AFS *California Regional Foundry Conference*. Huntington-Sheraton Hotel, Pasadena, Calif.

16-20 . . American Society for Metals, 11th *Western Metal Exposition & Con-*

gress. Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles.

16-20 . . National Association of Corrosion Engineers, *Annual Conference & Show*. Chicago.

18-19 . . Foundry Educational Foundation, *Annual College-Industry Conference*. Hotel Statler-Hilton, Cleveland.

19-20 . . AFS *Texas Regional Foundry Conference*. Menger Hotel, San Antonio, Texas.

APRIL

6-10 . . American Welding Society, *Annual Meeting and Welding Exposition*. Hotel Sherman, Chicago.

8-9 . . Malleable Founders' Society, *Market Development Conference*. Hotel Cleveland, Cleveland.

13-17 . . AFS *Engineered Castings Show and 63d Annual Castings Congress*. Hotels Sherman and Morrison, Chicago.

18-22 . . American Society of Tool Engineers, *Annual Meeting*. Milwaukee.

MAY

13-15 . . National Industrial Sand Association, *Annual Meeting*. The Homestead, Hot Springs, Va.

17-21 . . American Ceramic Society, *Annual Meeting*. Palmer House, Chicago.

25-26 . . Malleable Founders' Society, *Annual Meeting*. The Homestead, Hot Springs, Va.

27-28 . . American Iron and Steel Institute, *Annual Meeting*. Waldorf-Astoria Hotel, New York.

JUNE

18-20 . . AFS *Foundry Instructors Seminar*. University of Illinois, Urbana, Ill.

25-27 . . AFS *Penn State Foundry Conference*. Pennsylvania State University, University Park, Pa.

Horwitz!

published by

AMERICAN FOUNDRYMEN'S SOCIETY

Golf & Wolf Roads, Des Plaines, Ill.

VAnderbilt 4-0181

■ The cover—Rude Media Company's cupola is the subject of the bas-relief photograph on this month's cover. A feature story on this interesting operation appears on page 25.

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december, 1958
vol. 34, no. 6

modern castings

features

departments

THE "KING" IS DEAD LONG LIVE THE KING

When you receive your January 1959 issue of MODERN CASTINGS you may be surprised, but we're sure you'll be pleased. MODERN CASTINGS henceforth will come to you in standard 8¼ x 11¼ in. size throughout.

From now on, although MODERN CASTINGS will not be published in "king size" . . . it will continue the king-size values that readers have come to expect from "The Foundrymen's OWN Magazine."

Each month, authentic and well-illustrated articles dealing with problems of foundry management, operations and techniques will cover every phase of metalcasting.

Each month, MODERN CASTINGS readers will enjoy the finest technical material available on metalcastings . . . the papers prepared for presentation at annual conventions of AFS. As in the past, this TRANSACTIONS material will appear as a center section, easily removable for reference purposes.

Each month, the many activities of American Foundrymen's Society will be adequately covered in the tremendously popular AFS NEWS AND VIEWS section. Plans are afoot to further broaden the news of chapters, technical committees, research projects, regional conferences, and personalities of the industry.

Each month, MODERN CASTINGS will continue such widely read features as Products and Processes, For The Asking, Dietrich's Corner, The SHAPe of Things, Editor's Report, Foundry Facts Notebook, Foundry Trade News, Patent Review, Coming Chapter Meetings, Here's How, Castings Through the Ages.

Such king-size editorial values have given MODERN CASTINGS a king-size readership. Reader inquiries concerning advertisements and news items have grown to the unprecedented rate of *over 35,000 per year* . . . plus thousands of reprints of feature articles.

Also continued will be the king-size circulation of MODERN CASTINGS, mailed monthly to *every* foundry in the United States and Canada. Over 13,000 members of AFS throughout the world receive the publication.

While the "king-size" of MODERN CASTINGS now is officially dead, the king-size progress of MODERN CASTINGS and the American Foundrymen's Society will continue to grow. During the past two years alone, AFS initiated two important projects of far-reaching significance: the Engineered Castings Show, exclusively for market development of castings . . . and the Training and Research Institute for training and upgrading foundry supervision.

The new format and size of MODERN CASTINGS is another step in the direction of greater service to a greater membership and readership.

Wm W Maloney

WM. W. MALONEY
General Manager

lets get personal

A. H. Ciaglia . . . recently transferred to G. E. Smith, Inc., Atco, N. J. as sales and service engineer. Formerly with Pennsylvania Foundry Supply & Sand Co., Philadelphia, he developed processes that will continue to be produced for him. Ciaglia has spent his career in concentrating on research and development of foundry and chemical processes and is a member AFS Philadelphia Chapter.

B. L. Bevis . . . is the new foundry superintendent for East St. Louis Castings Co., East St. Louis, Ill. He is a member, AFS St. Louis Chapter.

T. A. Claiborne . . . was named as southwest district sales manager to head the newly established Southwest sales district, Tennessee Products & Chemical Corp., Nashville, Tenn. From his headquarter in Houston he will cover the four-state area of Texas, Arkansas, Oklahoma and Louisiana and direct the sales of ferro-alloys, pig iron and coke manufactured by both this firm and Tenn Tex Alloy Corp.

R. A. Shonk . . . has been promoted to vice-president and general manager and **F. A. Moorecroft** became assistant secretary and assistant treasurer, General Refractories Co. of Canada, Ltd., Smithville, Ontario. The Canadian firm is a wholly-owned subsidiary of General Refractories Co., Philadelphia, one of the world's largest producers of refractory bricks, mortars and castables.

J. A. Mahoney, Jr. . . . has taken the position as sales engineer for Pangborn Corp., Hagerstown, Md. and will be headquartered at the Philadelphia office.

L. F. Corp . . . has been promoted to assistant divisional manufacturing manager, a new executive position of Central Foundry Division, GMC, and will assist **C. A. Koerner**, divisional manufacturing manager, in the manufacturing activities of the three plants at Saginaw, Mich., Defiance, Ohio and Danville, Ill. **A. J. Karam** has been promoted to plant manager, succeeding Corp, and will be responsible for all activities at the Saginaw Malleable Iron Plant.

C. W. Briggs . . . technical and research director, Steel Founders' Society of America, Cleveland, addressed the British Steel Castings

Research Association Annual Conference in Harrogate, England. This is the second of a series of exchange lectures between the organizations. Briggs' paper was *The Deoxidation and Degassing of Cast Steel* which followed the B.S.C.R.A. conference theme on *Steel Making and the Properties of Steel Castings.* While in England Briggs will visit the British Cast Iron Research Association, Research Laboratories of Foundry Services, Ltd. and the new steel foundry of Samuel Osborn & Co., Ltd., in Sheffield.

G. R. Sullivan . . . was elected vice-president of A. P. Green Fire Brick Co., Mexico, Mo., following a meeting of the board of directors. He was also reappointed director of industrial relations, a position he has held for the past nine years.

Dr. G. H. Clamer . . . president, Ajax Engineering Corp., Trenton, N. J., has been elected chairman of the board. He is succeeded as president by **Manuel Tama. Mario Tama** has been elected vice-president. Dr. Clamer is one of the pioneers of electric induction melting and heating whose initiative sparked the invention of the Ajax-Wyatt 60 cycle induction-melting furnace for brass. Manuel Tama has been an officer of the company since its inception and has been responsible for the successful development of induction melting furnaces in many different metalworking industries handling aluminum, copper and zinc. Mario Tama, secretary and engineer since 1942, made many technical developments in the field of 60 cycle induction melting and many of his patented inventions are widely used today, such as the twin-coil inductor, the electromagnetic pump, the ajaxomatic pouring unit, 60 cycle induction galvanizing furnaces and many others.

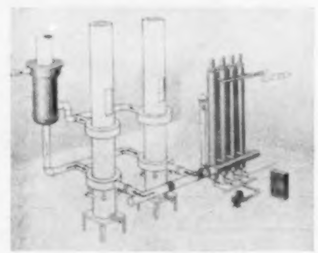
A. S. Lundy . . . has been promoted from chief engineer to vice-president, Claude B. Schnieble Co., Detroit, Mich. He is a member, AFS Detroit Chapter.

J. S. Smart, Jr. . . . is the new general sales manager of American Smelting & Refining Co., New York. **R. L. Wilcox** has been named assistant sales manager. Smart will work directly with **S. D. Strauss**, vice-president in charge of sales, and will be responsible for the administration of the sales department and for sales of major metal products and by-products of primary smelting and refining.

Build an idea file for plant improvements. The post-free cards on page 7-8 will bring more information on these new . . .

products and processes

HOT BLAST CUPOLA . . . equipment produces reductions in coke consumption, greater use of scrap iron and steel in the charge and



better castings, according to manufacturer. Equipment delivers hot blast air 400-1200 F in quantities up to 18,000 cfm in 2-3 min. *Brown Fintube Co.*

For Manufacturer's Information
Circle No. 311, Page 7-8

PAYROLL TAX COMPUTER . . . reportedly cuts payroll computing time in half. Shows withholding tax

and new 2-1/2 per cent social security deductions on one line for weekly wages up to $250. Move plastic slide to wage bracket desired. *Calcu-Tax Corp.*

For Manufacturer's Information
Circle No. 312, Page 7-8

PLASTIC CORE BOX VENT . . . designed for quick replacement of screen and slotted vents in core boxes and blow plates. Manufacturer states life of plastic vent is up to five times greater than other vents, and they can be mounted on vertical walls of core boxes without distorting or restricting removal of cores. Self-cleaning vents are available in 3/16 to 1-1/2-in. sizes; they are acid, oil and steam resistant and eliminate slicking or mudding. *Better Foundry Products.*

For Manufacturer's Information
Circle No. 313, Page 7-8

CHEMICAL BONDING . . . adhesives involving use of two liquids which are mixed just before use to cure the bond by chemical action strength. Tractor in picture, 44,000 lb, is suspended from three steel

plates bonded by 1/4 oz of the adhesive. Company says material useful as casting and filling compound, and as protective coating on metals forming surface resistant to wear, oxidation and most chemicals. *Narmco Resins & Coatings, Co.*

For Manufacturer's Information
Circle No. 314, Page 7-8

FLEXIBLE, ALL-STEEL SANDPAPER . . . provides total of 750 cutting sides per sq. in. Manufacturer states product outlasts conventional sandpaper 10 times, and out-cuts it five to one. Reported to quickly rasp, sand and smooth wood, plaster, plastics and soft metals. *Red Devil Tools.*

For Manufacturer's Information
Circle No. 315, Page 7-8

PREVENTVE MAINTENANCE SYSTEM . . . pinpoints parts on individual machines that should be replaced before they break down. Pro-

gressive signals show inspection schedule and colors indicate type of work to be done. Space provided for listing spare parts to be kept on hand. *Acme Visible Records, Inc.*
For Manufacturer's Information Circle No. 316, Page 7-8

PREVENTS "DUSTING" . . . on concrete floors. One-coat liquid treatment is said to penetrate deeply, bind small concrete particles together and retard their progressive breakaway under traffic. Company officials state that product also fills surface capillaries with tough, resilient plastic rubber. One gal reportedly conditions 250-400 sq ft. *Maintenance Inc.*
For Manufacturer's Information Circle No. 317, Page 7-8

STOPS CORROSION . . . of metal walls, ceilings and structural framework, manufacturer reports. Two-ply treatment includes rust inhibitive primer and synthetic resin top coat. *Master Mechanics Co.*
For Manufacturer's Information Circle No. 318, Page 7-8

PAINT RESISTS 1000 F . . . made of graphite and silicones, company reports this paint is capable of withstanding violent thermal shock of 1000 F when applied to metal and plunged into ice water. Shock did not cause paint to crack, peel, flake or bubble. *Joseph Dixon Crucible Co.*
For Manufacturer's Information Circle No. 319, Page 7-8

RUST PREVENTION . . . is said to provide effective, low-cost rust prevention on all rusted or rustable metals. May be used directly over firm, rusted surfaces without peeling or flaking, manufacturer claims. Acts as both prime and finish coat. One gal. covers 300-400 sq. ft. *Arted Co.*
For Manufacturer's Information Circle No. 320, Page 7-8

FIRE EXTINGUISHER . . . dry chemical type, utilizes powder to push fire ahead while affording protection against heat and flame. In company test, oil spill fire, 30 ft in diameter, was extinguished in 30 sec. *Safety First Products Corp.*
For Manufacturer's Information Circle No. 321, Page 7-8

PIPING INSULATION . . . cellular rubber tubing designed to insulate all warm or cold fluid piping, keeps temperatures constant while preventing condensation on heating or cooling tubes. Reported to be easily installed, bending up to 180 deg. without cutting or fitting. *Rubatex Div., Great American Industries, Inc.*
For Manufacturer's Information Circle No. 322, Page 7-8

FORK-LIFT TRUCK . . . features clutch with 12-month unconditional guarantee. Lubrication system is re-

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BOOM!

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BOOM!

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. . . so . . .

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portedly simplified through use of rubber mountings and sealed bearings which eliminate hard to get to pressure fittings. Speeds up to 19 mph. *Mercury Mfg. Co.*

For Manufacturer's Information Circle No. 323, Page 7-8

SOLVE GLAZING PROBLEMS . . . with translucent plastic panes and panels highly resistant to stress and strain, rapid changes in temperature and breakage. Slow heat transference characteristics afford greater insulation properties than glass. Lightweight makes them easy to handle and install. *Structoglas Div., International Molded Plastics, Inc.*

For Manufacturer's Information Circle No. 324, Page 7-8

HEAVY-DUTY BOLT ANCHOR . . . for anchoring heavy equipment to masonry with bolts. Precision-cast caulking sleeve is of special lead alloy developed for masonry anchors. Anchorage equal to strength of bolts achieved by using number of anchors on bolt. *Rawlplug Co.*

For Manufacturer's Information Circle No. 325, Page 7-8

MOVABLE WALLS . . . designed to go up quickly and easily in two-man operation. Construction contains 4-ft. wide panels of asbestos cement board and reportedly low-cost steel framing. Officials state movable walls can be quickly dismantled and re-assembled. Material such as tile may be cemented on wall panels. *Power-Strut, Inc.*

For Manufacturer's Information Circle No. 326, Page 7-8

MOBILE LADDER TRUCK . . . is low enough to pass through standard 6-ft, 8-in. door; yet, when fully extended, enables practical reach to 16 ft. Manufacturer claims unit is stable and solid when extended. Ladder extensions, locked in place by double locks, released only by operator using one hand on each at once. *Rol-Away Truck Mfg. Co.*

For Manufacturer's Information Circle No. 327, Page 7-8

HAMMER-IN AND DRILLING . . . tool combines masonry drill holder with regular hammer-in tool. Sets 1/4-in. fasteners only, after drilling holes into face brick or tile. Also applicable for thin steel. *Olin Mathieson Chemical Corp.*

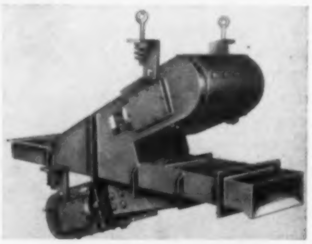
For Manufacturer's Information Circle No. 328, Page 7-8

GRINDING WHEEL . . . features floating action reportedly freeing wheel from edge distortion due to centrifugal force, resulting in fast cutting and longer belt life. Useful in polishing and grinding as well as rough deburring. Abrasive belts will not slip under heaviest work or cor-

■ Details on these products and processes are available to MODERN CASTINGS readers. See page 7-8.

ner grinding, company states. Designed for speeds up to 3450 rpm. *Miller Products, Inc.*
For Manufacturer's Information Circle No. 329, Page 7-8

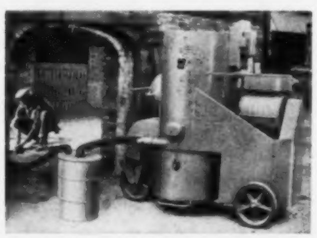
HEAVY-DUTY FEEDERS . . . operating on electromagnetic vibratory principle designed for high capacity feeding where installation space is



limited. Two drives mounted above and below trough to eliminate extra length of standard units. Capacities 25-1000 tons per hr. *Syntron Co.*
For Manufacturer's Information Circle No. 330, Page 7-8

DISPERSIONS . . . of tetrafluoroethylene resins have characteristics enabling application of plastic to heat-sensitive surfaces. Thus, company officials report, lubricating, corrosion resistant film can be applied to wood, rubber, plastics, light metal, etc., as curing is possible at 300 F or less. *Acheson Colloids Co.*
For Manufacturer's Information Circle No. 331, Page 7-8

PORTABLE PNEUMATIC CONVEYING . . . of sand or corrosive materials at rate of 50-100 lb per min possible with new unit useful



in materials moving and recovering. Doubles as vacuum cleaner. Company states unit can be wheeled to desired location. *U. S. Hoffman Machinery Corp.*
For Manufacturer's Information Circle No. 332, Page 7-8

FLOOR CRANE . . . is counterbalanced unit having adjustable boom with hook reaching up to 48 in. beyond edge of truck. Eliminates need for clear ceiling space over crane and need for placing load on

pallet for handling. Lift to 10 ft. Available in capacities 1000-3000 lb at full extension with fork attachment. Hand or battery power to boom and also for propulsion. *Vanguard Engineering Co.*

For Manufacturer's Information Circle No. 333, Page 7-8

product report . . .

Television x-ray inspection, providing 100 per cent product inspection on a television-type screen, and reportedly 10,000 times brighter than a conventional flouroscopic image, has been unveiled by the X-Ray Dept., General Electric Co., Milwaukee.

The new TVX, unlike ordinary flouroscopic inspection which requires the inspector to work in a darkened room or area and then for only relative short periods of time, is bright enough for easy viewing in normally lighted areas. The viewing monitor provides the product inspector with an image size which is electronically variable from 1/2 to 3 times that of the original object. This enlargement is possible without greatly affecting sensitivity.

The General Electric system, which is comparable to standard closed-circuit TV systems, permits the addition of extra monitor, or any ordinary TV receiver if simultaneous observation from separated locations is desired, it is pointed out.

The General Electric TVX system allows product inspection viewing up to 1400 ft distance between monitor and camera with the monitor and inspector remote from any x-radiation. This system permits the safe use of any x-ray intensity necessary for adequate penetration up to the limit of the associated x-ray generator.

The TVX system consists of three basic units, the x-ray sensitive camera, the control unit and the viewing monitor. All controls required for routine operation are located on front panels of the control and monitor units. The monitor unit is designed to nest on top of the control unit to conserve space; additional receivers require no booster amplifier. The system reportedly can be used with any standard x-ray generating apparatus and materials handling or positioning equipment provided by the user.

For Manufacturer's Information Circle No. 334, Page 7-8

obituaries

V. A. Crosby, 64, manager, automotive development, Climax Molybdenum Co., Div. American Metal Climax, Inc., New York, died Sept. 2. He had been with the company since 1934. A member and past chairman, AFS Detroit Chapter, he was awarded in 1951 the Penton Gold Medal for "outstanding service to the Society and contributions to the dissemination of information relating to ferrous foundry metallurgy". Crosby was also a member, American Society for Metals and American Society for Testing Materials. He contributed generously of his time and technical knowledge to the AFS Gray Iron Division.

V. A. Crosby

N. C. Swigart, vice-president, purchasing and traffic, Whiting Corp., Harvey, Ill., died Sept. 11. He joined the company in 1942 and was appointed vice-president in 1956.

V. L. Kelley, assistant vice-president, Tennessee Products & Chemical Corp., Chattanooga, Tenn., died recently. He was a member, AFS Tennessee Chapter.

R. A. Priebe, sales manager, Central Iron Foundry Co., Detroit, died recently. He held a membership in the AFS Detroit Chapter.

W. A. McClellan, foundry superintendent, Clark Bros. Co., Olean, N. Y., died recently. He was a member, AFS Western New York Chapter.

E. J. Bush, 65, retired since June from the position of foundry master mechanic, United States Naval Gun Factory, Washington, D. C., died Sept. 11. He had been a member, AFS Chesapeake Chapter, since 1925.

Build an idea file for plant improvements. Reader Service Cards, page 7-8 will bring more information . . .

for the asking

Ceramic gating . . . catalog covers components for all standard cores, splash cores, elbows and tubes. *Universal Clay Products Co.*
Circle No. 395, Page 7-8

Self dumping hoppers . . . described and illustrated with on-the-job photographs in brochure, available when you use this circle number. *Roura Iron Works, Inc.*
Circle No. 396, Page 7-8

Fork lift trucks . . . from 3000 to 10,000 lb capacities, presented in folder. *Allis-Chalmers Mfg. Co.*
Circle No. 397, Page 7-8

Roller conveyor . . . bulletin, 12 pp, includes many illustrations and diagrams of applications. *Rapids-Standard Co.*
Circle No. 398, Page 7-8

Vacuum melting techniques . . . and high-temperature vacuum-melted alloys covered in brochure. *General Electric Co., Metallurgical Products Dept.*
Circle No. 399, Page 7-8

Rust removal . . . material said to chemically change rust, preparing surface for painting, explained in 4-p folder. *Rusticide Products Co.*
Circle No. 400, Page 7-8

Die casting machines . . . fully described in bulletin. *Cleveland Automatic Machine Co.*
Circle No. 401, Page 7-8

Temperature control . . . through warning and shut-off device outlined in bulletin. *Illinois Testing Laboratories, Inc.*
Circle No. 402, Page 7-8

Hand-stroke belt sander . . . presented in in catalog sheet. *Boice-Crane Co.*
Circle No. 403, Page 7-8

Silicon nitride . . . reportedly resists attack by non-ferrous metals. Use circle number below for copy of the bulletin. *Haynes Stellite Co., Div. Union Carbide Corp.*
Circle No. 405, Page 7-8

Conveyor weighing . . . equipment discussed in catalog. *Nomad Equipment Div., Westover Corp.*
Circle No. 406, Page 7-8

Safety equipment . . . pictured and explained in catalog, with research, production and laboratory facilities. *United States Safety Service Co.*
Circle No. 407, Page 7-8

Lift truck . . . with 24-volt electrical system described in circular. *Lewis-Shepard Products, Inc.*
Circle No. 408, Page 7-8

Ultrasonic cleaners . . . detailed in 4-p catalog. *Narda Ultrasonics Corp.*
Circle No. 409, Page 7-8

Magnesium . . . in the electronics industry discussed in 20-p, colorful brochure. *Dow Chemical Co., Magnesium Dept.*
Circle No. 410, Page 7-8

Adjustable storage racks . . . shown in brochure. *Palmer-Shile Co.*
Circle No. 411, Page 7-8

Thermocouple wells . . . thermometer sockets and test wells listed in bulletin. New line. *Claud S. Gordon Co*
Circle No. 412, Page 7-8

Conveyors . . . gravity and power, illustrated in catalog. *Logan Co.*
Circle No. 413, Page 7-8

Dust collector . . . wet inertial type, presented in bulletin. *Joy Mfg. Co.*
Circle No. 414, Page 7-8

Core and mold ovens . . . presented in illustrated, 24-p booklet. *Foundry Equipment Co.*
Circle No. 415, Page 7-8

Vibrating packers and conveyors . . . described with guide to selection of proper conveyor for your needs. *Ajax Flexible Coupling Co.*
Circle No. 416, Page 7-8

Vibrating screen . . . catalog is yours when you circle the number below. *Syntron Co.*
Circle No. 417, Page 7-8

Materials handling . . . flow plan technique for conveyor application presented in 56-p bulletin. *Rapids-Standard Co.*
Circle No. 418, Page 7-8

Materials Handling Institute . . . brochure explains functions of the organization. *Materials Handling Institute, Inc.*
Circle No. 419, Page 7-8

Palletizing . . . by steel strapping to facilitate materials handling outlined in brochure. *Acme Steel Co.*
Circle No. 420, Page 7-8

Fork trucks . . . handling of cores and castings portrayed in case-history report. *Clark Equipment Co.*
Circle No. 421, Page 7-8

Blowers . . . fans, exhausters, etc., pre-

sented in data file folder. Use circle number below. *Wm. W. Meyer & Sons.*
Circle No. 422, Page 7-8

Crucibles . . . for metal working is subject of 16-p catalog. *Norton Co.*
Circle No. 423, Page 7-8

Shell casting . . . featured in monthly publication. *Cooper Alloy Corp.*
Circle No. 424, Page 7-8

Copper-base alloys . . . data covering 16 mechanical and physical properties of three alloys presented in bulletin. *Brass & Bronze Ingot Institute.*
Circle No. 425, Page 7-8

Gearshift drive . . . bulletin describes construction and typical applications. *Lima Electric Motor Co.*
Circle No. 426, Page 7-8

Motor brushes . . . for replacement maintenance of electric fork trucks and other materials handling equipment detailed in folder. *Ohio Carbon Co.*
Circle No. 427, Page 7-8

Permanent molds . . . for production of metals, glass, plastics and rubber covered molds, in 4-p bulletin. *Meehanite Metal Corp.*
Circle No. 428, Page 7-8

Welding properties . . . of recently developed aluminum alloy are covered in results of study. *Navan Products, Inc.*
Circle No. 429, Page 7-8

Manufactured graphite . . . technical data offered in handbook. *National Carbon Co., Div. Union Carbide Corp.*
Circle No. 430, Page 7-8

Equipment leasing . . . analyzed in booklet. *United States Leasing Corp.*
Circle No. 431, Page 7-8

Rust index . . . offers comparative rates of rust for different parts of the country. *Rust-Oleum Corp.*
Circle No. 432, Page 7-8

New barrel finishing . . . machine incorporates vibration in operation; use circle number to learn all about it. *Metal Finish, Inc.*
Circle No. 433, Page 7-8

Conveyor belt . . . said to require no breaker fabric shown in bulletin. *Raybestos-Manhattan, Inc.*
Circle No. 434, Page 7-8

Open-type motor . . . said to be unaffected by moisture, dust, dirt, oils, acids and alkalies is discussed in brochure. *Allis-Chalmers Mfg. Co.*
Circle No. 435, Page 7-8

Refractories . . . castables, company personnel and facilities covered in brochure. *Mexico Refractories Co.*
Circle No. 436, Page 7-8

Floor trucks . . . 4-wheeled, covered in circular aids in their selection. Circle number below on Reader Service Card, page 7-8.
Circle No. 437, Page 7-8

Foundry practice . . . bulletin includes four technical articles dealing with: alu-

Circle No. 477, Page 7-8

minum rotor castings, copper-tin alloys, pressure and exothermic feeding of iron castings, and heat treatment. *Foundry Services, Inc.*
Circle No. 438, Page 7-8

Collective bargaining . . . do's and dont's summarized in 10-p article. *National Foundry Association.*
Circle No. 439, Page 7-8

Steel casting brochure . . . lists three basic requirements for successful product design. *Steel Founders' Society of America.*
Circle No. 440, Page 7-8

Photodrawings . . . publication describes the use of photographs to convey engineering-drawing information. *Eastman Kodak Co.*
Circle No. 441, Page 7-8

Machining manual . . . 22 pp, contains guide for machine feeds and speed, and quantity-weight slide-rule calculator. *Kaiser Aluminum & Chemical Sales, Inc.*
Circle No. 442, Page 7-8

Carbon sand . . . a new molding material composed of particles of hard carbon is described and compared with other molding sands in 16-p booklet. *J. S. McCormick Co.*
Circle No. 443, Page 7-8

Index . . . to 1957 Modern Castings with cross references by subject, title and author available. *American Foundrymen's Society.*
Circle No. 444, Page 7-8

Tape recordings . . . of technical talks on many facets of the metal castings industry are available from AFS. Includes discussions on cupola operation, air pollution control, self-curing oil binders, producing quality castings and many more. Circle number below for complete listing and prices. *American Foundrymen's Society.*
Circle No. 445, Page 7-8

Welders' vest-pocket guide . . . 60 pp. describes and illustrates four essentials of proper welding procedures, types of joints and welding positions. *Hobart Bros. Co.*
Circle No. 446, Page 7-8

Pinholes or inclusions . . . is the title of newsletter which discusses inspection, causes, inclusions, improperly cleaned ladles and other factors causing these faults. *American Colloid Co.*
Circle No. 447, Page 7-8

Technical data . . . catalog free. Revised listing of pocket-size books selling for $1.25 covering every field of engineering. *Lefax Publishers.*
Circle No. 448, Page 7-8

Machining gray and nodular iron . . . 22-p booklet covers machining properties of cast iron. Performance data supplied on various types of grinders. *Hamilton Foundry & Machine Co.*
Circle No. 449, Page 7-8

Steel castings operations . . . depicted in booklet, 18 pp, covering manufacturing

steps in producing stainless, carbon and alloy steel castings. *Empire Steel Castings, Inc.*
Circle No. 450, Page 7-8

Metalcasting technology . . . experts have written many books and manuals which are available through AFS. A complete, classified list is yours when you use the circle number below. *American Foundrymen's Society.*
Circle No. 451, Page 7-8

Training courses . . . pertinent to every type of metalcasting work are offered by the AFS Training and Research Institute. For free brochure covering all courses offered, circle number below on Reader Service card, page 7-8. *American Foundrymen's Society.*
Circle No. 452, Page 7-8

Shell molding . . . guide, 34-p booklet, covers all aspects of the process with photographs to illustrate operations. Revised edition. *Durez Plastics Div., Hooker Electrochemical Co.*
Circle No. 453, Page 7-8

Steel-plastic . . . compound for binding like or unlike materials together described in brochure which includes case histories. *Devcon Corp.*
Circle No. 454, Page 7-8

Performance report . . . case histories covering use of electric furnaces and materials handling equipment in metalworking plants. Illustrated booklet available on request. *Whiting Corp.*
Circle No. 455, Page 7-8

Conveyors . . . hinged steel belt type for handling scrap, gates and risers, chips and castings described in catalog. Includes "moving sidewalk" type. *May-Fran Engineering, Inc.*
Circle No. 456, Page 7-8

Mobile crane . . . materials handling portrayed in booklet delineating features and applications. *Coles Cranes.*
Circle No. 457, Page 7-8

training films

■ The following list of motion pictures and film strips will prove useful in educating your personnel to better perform their jobs. Circle the appropriate number on the Reader Service Card (page 7-8) for complete information regarding these films. Items indicate whether films are available free of charge, by rental or by purchase only.

Automation as Applied to Core Making . . . portrays use of 5-station automatic coremaking machine. Silent, 16 mm, color film, 15 min, free. *Cadillac Motor Car Div., General Motors Corp.*
Circle No. 458, Page 7-8

Foreman Training . . . a series of filmstrips presenting basic problems in human relations, outlining effect of improper handling and suggesting methods of avoiding mistakes. Sound, black and white, 35 mm, 15-20 min each, rental. *Vocafilm Corp.*
Circle No. 459, Page 7-8

Progress in the Mulling of Foundry Sands . . . sound, color film, 16 mm, 25 min, free. *Beardsley & Piper Div., Pettibone Mulliken Corp.*
Circle No. 460, Page 7-8

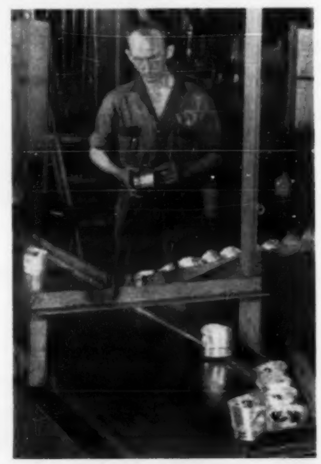
Foundry Flexibility . . . depicts materials handling equipment and production methods in new foundry specializing in wide variety of castings with frequent changes in production requirements. Sound, color film, 16 mm, 29 min, free. *Link-Belt Co.*
Circle No. 461, Page 7-8

New Foundry Horizons . . . illustrates core blowers, sand handling, molding, semi-continuous mold conveyors, shakeout, cleaning and annealing. Silent, black and white film, 16 mm, 40 min, free. *National Engineering Co.*
Circle No. 462, Page 7-8

Laying Out Small Castings . . . shows how to lay out holes for drilling, locate reference points, use calipers and combination square and surface gage. Sound, black and white film, 16 mm, 16 min, rental. *United World Films, Inc.*
Circle No. 463, Page 7-8

product report . . .

Abrasion resistant conveyor belt reportedly has handled sharp-edged aluminum-piston castings covered with cutting oil for over a year with little or no wear. Ford Motor Co.'s No. 1 engine plant, Cleveland, installed the Koroseal belt, manufactured by B. F. Goodrich Co., Akron, Ohio, upon finding that belts pre-



viously used for this purpose lasted only 2-6 months. Ford reports that the polyvinyl chloride belt has withstood abrasion, cutting and gouging from the castings; and has completely resisted deteriorating effects of cutting oils. The new belt can be wiped clean with a dry cloth, keeping parts clean during transfer from one operation to another.
For Manufacturer's Information
Circle No. 464, Page 7-8

have you read . . . ?

Campbell, Tom, **Iron and Steel Industry.** 1958, Bellman Publishing Co. Post Office Box 172, Cambridge 38, Mass. $1.

One of a series of monographs in the Vocational and Professional Monograph Series. Wherever guidance activity and general counseling in this field is desired, this book is helpful. The pamphlet includes material on: history of the occupation or industry, qualifications for employment, training required, methods of entry, opportunities for advancement, earnings, general trends in the occupation or industry and sources of further information.

St. John, Harry M., **Brass and Bronze Foundry Practice,** Penton Publishing Co., Cleveland, 1958, $8.

Brass founders will find in this book the facts and theories pertaining to their trade. The terminology, though technical in its ramifications, is kept simple. The ideas of one respected authority can be weighed against the views of another. The 23 chapters cover: technical and operating procedures, quality control, testing, brass foundry economics, cost control, casting design, patternmaking, foundry layout and salvage of waste materials. 85 illustrations and an index.

American Welding Society, **Recommended Safe Practices for Inert-gas Metal-arc Welding,** 33 West 39th St. N. Y. 18, N. Y. 1958, $1.

Outlines the problem of the potential hazards in this somewhat dangerous field. Findings are summarized and recommendations are made when welders deal with radiant and radioactive electrodes as well as metal fumes. The booklet number is AWS A6.1-58.

Techniques of Plant Maintenance and Engineering. Clapp and Poliak, Inc., New York, 1958, vol. 9, 211 pp.

This is the proceedings of the technical sessions held concurrently with the ninth national plant maintenance and engineering show in Chicago. Among the articles are: welding in maintenance, how to save on electric power bills, maintenance in small plants (50 maintenance employees), in little plants (10 maintenance employees), of pulp and paper mills labor relations, preventative maintenance, planning and scheduling, upkeep of electric motors, sanitation objectives, cooperation from maintenance employees, plant engineering, automation aspects, cost control, and air and water pollution. There are also the notes from round table discussions in specific industries; such as, metalworking plants, metal fabricating plants, foundries, steel mills, petroleum processing plants, research and development plants, rubber and chemical plants, food-processing plants and the like.

AFS Librarian—*A. C. Lohse*

foundry trade news

STEEL FOUNDERS' SOCIETY OF AMERICA . . . held their 56th Fall Meeting at the Homestead, Hot Springs, Va. Society President R. L. Gilmore, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., opened the meeting by detailing several of the services S.F.S.A. performs for members on a day-to-day basis. J. M. Marston, Ball, Burge & Kraus, Cleveland, spoke on *The Steel Castings Industry as an Investment*. He outlined factors which go to make up favorable recognition in the investment market and analysed steel castings industry. Joseph Pelej, Price Waterhouse & Co., New York, reviewed methods by which accounting control can be achieved in a talk entitled *An Approach to Management Cost Accounting Control*.

M. J. Allen, chairman of S.F.S.A. advertising and public relations committee, American Steel Foundries, Inc., Chicago, talked on *The Industry Booklet*. Dr. G. H. True, Institute of Visual Research, Inc., South Bend, Ind., addressed the meeting on *Are You Sitting on Your Ideas*. True dramatically presented problems associated with communicating ideas from employees and executives into understanding hands and subsequent difficulties which frequently prevent their full use. The meeting was concluded with the Annual Banquet.

NON-FERROUS FOUNDERS' SOCIETY . . . recently held their Philadelphia Management & Operating Conference at the Benjamin Franklin Hotel, Philadelphia. European foundry practice combined with current business and production practices of United States provided non-ferrous foundrymen with a 14-hour, fast moving meeting. Conference was preceeded by a meeting of executive committee with officials of Copper Division and Aluminum & Magnesium Div., Business & Defense Services Administration, Washington, D. C., and a meeting of the Cast Bronze Bearing Institute, a new Society affiliate at Franklin Institute. It has a technical manual on sleeve bearing design and application in progress. One day was devoted to N.F.F.S. board meeting highlighted by discussions of marketing and progress on establishment of cost comparison groups.

Wm. Grimm, Wm. Grimm Foundry, Philadelphia, N.F.F.S. national director, presided throughout the sessions. R. E. Bietry, B & S Bronze Foundry, Inc., Brooklyn, recounted his experiences in a talk entitled *Is Diaphragm Molding for You.* He related experiences with technique and equipment for diaphragm molding, starting with his first interest developed on seeing equipment dem-

Seated at speakers' table, Annual Steel Founders' Society of America, Annual Banquet (left to right) **Mr. and Mrs. C. C. Brownmiller**, Treadwell Engineering Co. Easton, Pa.; **Mr. and Mrs. C. R. Wyckoff, Jr.**, Atlas Steel Castings Co., Buffalo, N. Y.; **Mr. and Mrs. B. P. Hammond**, Foundry Mill Machy. Div., Blaw-Knox Co., Pittsburgh, Pa.; **Mrs. and Mr. R. L. Gilmore**, Superior Steel & Malleable Castings, Co., Benton Harbor, Mich.; **Mrs. and Mr. C. H. Welch**, Alloy Cast Steel Co., Marion, Ohio; **Mrs. and Mr. E. F. Marquardsen**, Pacific Steel Casting Co., Berkeley, Cal.; **Mrs. and Mr. J. W. Perry, Jr.**, Grede Foundries, Inc., Milwaukee.

onstrated at an AFS Castings Congress.

A cost program rounded out the morning program. Speakers and subjects were: *Estimating Production for Profit*, G. T. Fischer, Fischer Casting Co., Dunellen, N. J.; *Operations and Supervision*, R. L. Thompson, Crown Non-Ferrous Foundry, Inc., Chester, Pa.; and Wm. A. Gluntz, Sr., Gluntz Brass & Aluminum Foundry Co., Cleveland. E. J. Metzger, Multi-Cast Corp., Wauseon, Ohio, was the moderator. Following luncheon at which N.F.F.S. vice-president E. G. Brummund, Brummund Foundry, Chicago, presided, M & O sessions continued. P. J. Keeley, Northern Bronze Corp., Philadelphia, described his recent work with CO_2 sands.

Conferees then visited Northern Bronze Corp., viewing the plant layout and production facilities. After returning to the hotel they attended a reception and dinner at which C. A. Sanders, American Colloid Co., Skokie, Ill., spoke on *Better Castings Mean More Sales*. President Lankford spoke on *N.F.F.S. & Our Industry* and R. L. Thompson, chairman of management group, conducted a short management group meeting. M. E. Nevins, Wisconsin Centrifugal Foundry Co., Waukesha, Wis., 1st vice-president, was toastmaster.

GRAY IRON FOUNDERS' SOCIETY . . . Cleveland, held their 30th Annual Meeting Oct. 8-10, in the Sheraton Park Hotel, Washington, D. C. Over 200 members were present. Officers elected on opening day were A. M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass., to position of president succeeding J. Scott Parrish, Jr. Richmond Foundry & Mfg. Co., Richmond, Va., who will continue on the board in an advisory capacity. J. E. Quest, Quest Mfg. Co., Shakopee, Minn., is vice-president; W. A. Hepburn, John T. Hepburn, Ltd., Toronto, Ont. Canada, secretary; C. R. Garland, W. O. Larson Foundry Co., Grafton, Ohio, treasurer.

New directors named were J. T. Boyd, Golden's Foundry & Machine Co., Columbus, Ga.; W. G. Greenlee, Greenlee Foundry Co., Chicago; C. R. Gregg, Gregg Iron Foundry, El Monte, Calif., A. B. Sayre, American Abrasive Metals Co., Irvington, N. J. D. H. Workman re-appointed executive vice-president.

Highlight of the meeting was presentation of G. I. F. S. highest award, the Society's Gold Medal, to H. J. Trenkamp, formerly president of Ohio Foundry Co., Cleveland, and now associated with Taylor and Boggis Foundry Div. of Consolidated Iron-Steel Mfg. Co., Cleveland. Trenkamp

received the honor for his valuable and unselfish contributions to the welfare of the Society and gray iron foundry industry, as chairman of budget and finance committee, member of the board of directors, treasurer and president 1952-54.

Also honored were J. S. Parrish, Jr., Richmond Foundry & Mfg. Co., Inc. Richmond, Va., retiring president of the Society (1956-58). A. H. Renfrow, Renfrow Foundry, Los Angeles, Calif., was given recognition for unusual and outstanding service to the Society and gray iron industry.

The press was invited to attend the session in which Dr. R. R. T. Thomson, head of metallurgical engineering, research staff, and D. F. Caris, engineer in charge of power development group, engineering staff, General Motors Corp., spoke on *The Implications of the Aluminum Automobile Engine.*

The talk stated the engineering incentive to substitute aluminum for iron in automobile engines is to cut weight and boost efficiency. Indications are that aluminum is now competitive with iron from a cost standpoint. One important way to improve operating economy is to reduce automobile's weight through reduction of engine weight. An aluminum engine can weigh up to 200 lb less than its cast-iron counterpart. Application of high-wear resistant alloys eliminated the need for cylinder liners.

Caris explained that locating foundries adjacent to primary aluminum reduction plants has effected a substantial cut in cost of aluminum die castings. Dr. Thomson urged gray iron foundry industry to improve its product to meet the challenge of competitive materials; make its outlook flexible so if improvement is insufficient to meet the challenge of lighter metals, it can produce competitive material on an economic basis; and develop new products to replace business it must inevitably lose.

Brigadier General A. W. Betts, military executive-assistant to director of Guided Missiles, addressed the Industry luncheon meeting on part missile are playing in strengthening our deterrent posture. He explained policy of "peace through deterrence" quoting George Washington on the basic point that to preserve the peace, it must be known that at all times we are prepared for war.

Other speakers and subjects were: E. J. Walsh, executive-vice president, Foundry Educational Foundation, Cleveland—*Where do Your Castings Sales Start;* H. B. McCoy, administrator, Business & Defense Services Administration, Washington, D. C., *Helping Business is Our Business;* A.

P. Alfino, U. S. Chamber of Commerce, Washington, D. C., *Dealing with Union Power;* W. A. Slowinski, Baker, McKenzie & Hightower, Washington, D. C., *Problems in Perpetuating the Closely Held Company.* C. F. Walton conducted a panel symposium on *An Economical Evaluation of Melting Equipment.* Panel members were: J. D. James, Urick Foundry Co., Erie, Pa.; J. H. Culling, Carondelet Foundry Co., St. Louis, Mo.; and W. O. Larson, Jr., W. O. Larson Foundry Co., Grafton, Ohio.

Awards of the Annual Design Contest were made at the closing luncheon. First prize of 500 went to E. R. Zuehlke, Blacw-Clawson Co., Middletown, Ohio, for his inlet head and dirt collection box. Second place and prize of $100 was won by R. Q. Rinehuls, Automation Service, Inc., Poet Crane, N. Y., with an entry of a semi-automatic film-cutter case.

Five men tied for third place: L. K. Rudolph, McCulloch Motors Corp., Los Angeles, Calif.; O. W. Hoffman, General Electric Co., San Jose, Calif.; A. G. Bellos, Sandy Hill Iron & Brass Works, Hudson Falls, N. Y.; R. V. Morr, New Idea Div., AVCO Mfg. Corp., Coldwater, Ohio and W. A. Williams, consulting engineer, Philadelphia. Presentation was made by E. J. Tangerman, Product Engineering, chairman, judging committee. Other members of the committee were William Seelbach, Forest City Foundries, Cleveland; Professor D. K. Wright, Case Institute of Technology, Cleveland; W. W. Brown, Superior Foundry Inc., Cleveland.

James B. Clow & Sons . . . 80-year-old manufacturer of cast-iron pipes, opened a new $6,500,000 plant at Bensenville, Ill., last month. It is estimated that 1200 carloads of raw materials—sand, limestone, coke and iron, will be unloaded in 1959 and when in full production 80,000 tons of cast iron pipe will be produced annually.

MODERN CASTINGS was well represented at Open House of James B. Clow & Sons, Bensonville, Ill. Left to right: **K. L. Potter,** assistant editor; **T. A. Ripley,** vice-president, James B. Clow & Sons; **Virginia Sutterby,** production editor; **Ardelle Seeley,** secretary to editor; **E. L. White,** works manager, James B. Clow & Sons.

Why do foundries fail?

In the twelve months ending June 1, 1958, 9899 out of every 10,000 operating manufacturers of primary and fabricated metal products *did not* fail. The 101 out of every 10,000 who did fail represented the sixth highest failure rate among the 14 selected manufacturing lines for which rates were computed.

These failure rates are computed so that one industry can be compared to other industries and the national average for all manufacturers. To obtain this failure rate, Dun & Bradstreet computes how many businesses fail out of each 10,000 operating in a line.

Table 1 shows how manufacturers of primary and fabricated metal products fit into the failure rate picture among the 14 selected manufacturing lines of trade ranked in the order of numbers of failures per 10,000 concerns during the 12 months ending June 1, 1958.

The figures in Table 1 would indicate that manufacturers of primary and fabricated metal products are better off than manufacturers in some other lines. Yet, the 229 manufacturers of primary and fabricated metal products that failed in 1957 caused more than $36 million in losses to creditors—and if you add up the dollar losses to creditors over the past 24 years, the dollar losses total over $235 million.

While in comparison to other manufacturers, the failure rate of 101 for manufacturers of primary and fabricated metal products indicates how good things are in the line, the creditors who were unable to collect the millions they lost through failures of manufacturers of primary and fabricated metal products would have good reason to disagree.

1957 Failures

Now let's look at the failure statistics for the industry in 1957. During that year, 229 manufacturers of primary and fabricated metal products failed with liabilities of $36,-911,000. This represents the third highest annual number of failures reported since failure statistics were first prepared on the industry in

TABLE 1. FAILURE RATES IN MAJOR INDUSTRIES

Line of Business	Failure Rate Per 10,000 Operating Concerns
Furniture	266
Leather & Shoes	187
Transportation Equipment	162
Apparel	136
Electrical Machinery	113
METALS, PRIMARY & FABRICATED	101
Textiles	88
NATIONAL AVERAGE — ALL MANUFACTURERS	84
Machinery (Other than Electrical)	83
Lumber	62
Paper	58
Food	51
Chemicals and Drugs	48
Stone, Clay and Glass	47
Printing and Publishing	39

1934—topped only by 249 failures in 1956 and 243 failures in 1955. Liabilities of $36,911,000 reported in 1957, however, represented an annual record all-time high for the industry. Average liability for each failure in this group was $161,183—an increase of 65 per cent as compared to 1956's average liability per failure of $97,496. *This trend in failure statistics for the industry would seem to be continuing in* 1958 *based on tallies for the first six months of* 1958. *In that period,* 169 *manufacturers of primary and fabricated metal products have failed with liabilities amounting to* $17,301,000.

What Causes Failure?

A breakdown of the failure statistics for the metalcasting industry which are included in the above statistical data appears in Table 2.

To put the statistical data from Table 2 into its proper perspective one must realize that the 229 manufacturers of primary and fabricated metal products that failed in 1957 accounted for only a very small per cent of thousands of businesses which are engaged in the industry. These figures should not, therefore, suggest undue fright or lack of confidence in the industry.

What is the cause of a business failure? Through the years, one pattern has consistently recurred in Dun & Bradstreet's studies into the causes of bankruptcies involving losses to creditors. A failure can be traced in most instances to a clearly identifiable human weakness on the part of the people running the business. This human failure may be in judgment, personality, decision or know-how. The study of the causes of failure among all manufacturers will indicate danger signals that manufacturers of primary and fabricated metal products may use to check their operations. Dun & Bradstreet, Inc., did such a study on the 2,411 manufacturing failures, including manufacturers of primary and fabricated metal products, occuring in the year 1957. Results of the study are shown in Table 3.

You might say that 6.7 per cent of these failures were caused by circumstances beyond human control or "Acts of God." Some of these failures probably could have been prevented by proper insurance. The bulk of the failures, however, would appear to be management failures.

This group was further analyzed by the surface cause, or the reasons given as excuses, for the failure. More than one half (54.0 per cent) said it was because their sales were inadequate and another 16.5 per cent blamed tough competition. Failure to collect the money owed them was the cause stated by 12.1 per cent and another 5.8 per cent said it was inventory burden that forced them out of business. Heavy operating costs put 8.4 per cent out of business and another 9.3 per cent said their hands were tied by excessive fixed assets. A few, 0.4 per cent, said their trouble was poor location.

TABLE 2. BUSINESS FAILURES IN THE METALCASTING INDUSTRY

	Ferrous Foundries		Non-Ferrous Foundries	
Year	Number	Liabilities	Number	Liabilities
1950	6	$ 226,000	27	$1,057,000
1951	2	60,000	11	613,000
1952	4	676,000	12	801,000
1953	6	1,504,000	20	1,559,000
1954	8	1,111,000	30	1,969,000
1955	6	1,045,000	34	1,421,000
1956	9	1,360,000	18	1,323,000
1957	3	318,000	21	1,530,000
1958 (Jan.-June)	6	2,087,000	14	2,212,000

It should be pointed out at this time that Dun & Bradstreet's failure figures include only businesses that fail with losses to creditors. Not included in the Dun & Bradstreet tabulations are voluntary retirements from business, transfers of ownership, and those who closed their doors owing no bills. Therefore, the failures reported above for manufacturers of primary and fabricated metal products are not necessarily the only ones in the line who ceased operations in 1957, but they were ones that did so at the expense of someone else.

Are Failures Necessary

Because some failures in this analysis were attributed to a combination of apparent causes, the figures add up to slightly more than 93.3 per cent of the failures analyzed.

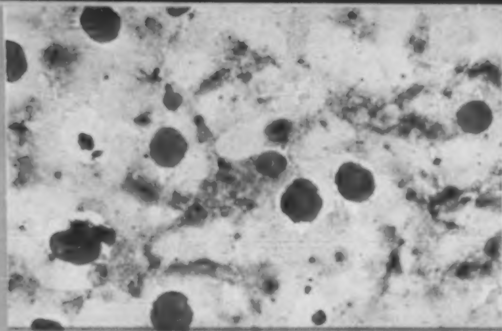
As we study the above picture, it is clear that *the basic problem of failure is lack of management experience and ability.* It goes without saying that a successful business does not just happen—it is the result of deliberately calculated and carefully followed policies. Businesses will not run themselves. They are merely reflections of the capabilities of the men behind them. A success doesn't just happen—neither does a failure. The basic consideration in the success or failure of a business is the owner's ability, on a continuing year after year basis, to make wise decisions compatable with the economic times—to buy wisely, to sell only as much as he can afford to sell, and to grow with the business.

Although it is no part of Dun & Bradstreet's function to predict the future, it is reasonably safe to say that 1959 will bring to all businesses problems to be solved and challenges to be met. A good long look at himself and his business never did any businessman harm. If the underlying causes of manufacturing failures in 1957 suggest areas of change or investigation, all well and good.

No matter what 1959 brings there is plenty of room for the metal casting producer who knows what he is doing and how to do it. Initial profits may be made by services and quality, but only sound management policies and practices will hold on to those profits and build the business.

TABLE 3. WHY INDUSTRIAL FIRMS FAIL

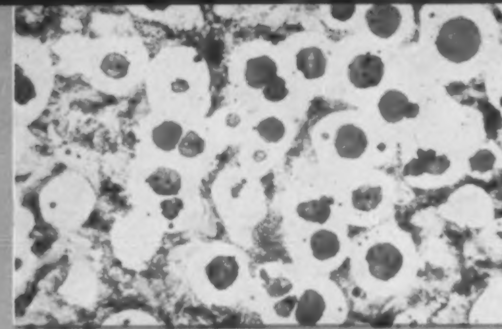
Cause	Per Cent	Number
Incompetence	50.2	1,211
Unbalanced experience	17.3	416
Lack of managerial experience	15.1	363
Lack of experience in the line	10.7	257
Neglect		
Poor health	1.9	47
Bad habits	0.4	9
Marital difficulties	0.2	4
Other	0.3	8
	2.8	68
Fraud		
Irregular Disposal of Assets	1.3	32
False Financial Statement	0.1	2
Premeditated Overbuy	0.0	1
Other	0.2	5
	1.6	40
Disaster		
Fire	0.8	17
Strike	0.2	4
Flood	0.1	3
Employees' Fraud	0.0	1
Burglary	0.0	1
Other	0.1	3
	1.2	29
Reason unknown	1.1	27
	100	2411



Ductile iron, BEFORE lanthanum

LANTHANUM

. . . the rare earth that softens ductile iron



Ductile iron, AFTER lanthanum

A. P. Alexander
International Harvester Co.
Memphis, Tenn.

The rare earth lanthanum has a rare influence on ductile iron properties. Recent work by Memphis Works of International Harvester Co. reveals that minute quantities of lanthanum have a potent softening influence on the structure of normally hard ductile iron castings. This softening action extends the range of compositions and section sizes castable with both high strength and good ductility.

Soft as-cast ductile irons can be produced with great difficulty from cupola irons treated with either magnesium or cerium alloys. This can be done only if special precautions are taken. One method is to make an extremely low silicon-base iron that would not be suitable for machinable gray irons. Then the iron is treated with a magnesium or cerium alloy containing high silicon. After the treatment, a further large addition of a silicon alloy is made. The base iron itself must have an extremely low manganese (below 0.40 per cent) and a low phosphorus (below 0.10 per cent).

To achieve this analysis, special raw materials in the form of premium-priced pig irons or carefully selected expensive steel scrap must be used. These requirements for soft as-cast ductile iron production make it impractical to economically make gray iron from the same base mix.

Ductile irons made from base irons that meet requirements of the S. A. E. specifications for gray iron are usually harder than 250 Bhn (3000 Kg load—10 mm ball) in standard 1-in. Y-block test castings, as illustrated in Military Specification MIL-Y-17166-A (SHIPS). Castings from these irons in sections of 1/4-in. or less are too hard for routine machining. In addition, these light section castings have enough free or massive iron carbides in the matrix of the cast structure to cause the casting to be brittle and to have no measurable ductility. The castings require a thermal treatment for satisfactory engineering use.

A method for producing ductile graphite gray-iron castings that would be of about the same hardness as gray iron from a base iron that would meet any normal gray iron specifications would be of great value. This would enable the foundry to pour easily machinable castings with strengths up to and above 90,000 psi. Special expensive precautions would not have to be taken in the foundry to produce nodular iron and gray iron separately.

It has been discovered that the addition of a mixture of magnesium ferro-silicon (8.50% Mg—46.00% Si—balance Fe) plus lanthanum, or magnesium ferro-silicon plus a special mixture of rare earth metals containing 30 per cent minimum lanthanum, added to molten gray iron, will result in a ductile graphite iron. After this molten ductile graphite iron has been innoculated with a late addition of a graphitizer, such as ferro-silicon up to 0.40 per cent, the resulting iron is soft. It has a hardness of about 200 brinell as-cast in a standard 1-in. Y-block. The tensile strength is from 80,000 to 100,000 psi. An elongation of from 3 to over 10 per cent can be obtained, depending on the silicon content. The base iron can be either hypo-eutectic or hyper-eutectic.

It is imperative that the rare earth metals or misch metal contain a minimum of 30 per cent lanthanum. Lesser amounts will not soften the nodular iron. The effect of the lanthanum on pearlite may be noted in the photo-micrographs shown in Fig. 1 and 2.

The benefits of lanthanum are independent of the composition of the base iron. However, it is preferable to keep the percentage of other elements such as phosphorus, silicon, manganese, nickel, etc., low for maximum ductility. If special characteristics such as high strength or wear resistance are required, the nodular graphite iron may be deliberately alloyed. In these cases, too, the lanthanum-treated nodular iron will be softer and have higher impact resistance.

Since excess lanthanum hardens iron, only a very minute amount should be used. Percentages of lanthanum from 0.004 to 0.020 will tend to soften nodular iron. Above 0.020 per cent the iron becomes progressively harder.

Nodular graphite iron castings made from iron treated as above with lanthanum have a hardness of from only 200 to 225 brinell, as cast in 3/16-in. sections. They machine as readily as normal gray irons in the as-cast condition. Chilled areas caused by free carbides are not evident in light sections.

The base mix for producing these soft as-cast nodular iron castings can be balanced to meet any A. S. T. M. specification for gray iron from 110 to 122 as described in A. S. T. M. Designation: A159-49T. This covers from 20,000 to 45,000 psi irons. Nodular graphite irons made from the same base iron by previous procedures would have over 250 Bhr in test bars and light castings would be machined with difficulty, if at all. Some examples of test bar physicals produced by this technique are listed in Table 1.

Reasons for the softening effect of lanthanum are not completely plain. It is suspected that lanthanum softens by combining with gases in the iron such as hydrogen, oxygen and nitrogen. These gases are extremely potent as hardeners of iron.

AS CAST PROPERTIES OF NODULAR IRON PRODUCED BY ADDITIONS OF HIGH LANTHANUM RARE EARTHS AND MAGNESIUM TO GRAY IRON

Si	2.47	2.51	2.74	2.81	3.21	3.56
C	3.44	3.51	3.53	3.21	3.21	2.82
Mn	0.41	0.39	0.45	0.44	0.47	0.45
P	0.05	0.04	0.04	0.05	0.06	0.08
S.	0.02	0.02	0.02	0.02	0.02	0.02
Ni	0.12	0.15	0.31	0.23	0.27	0.18
Cr	0.07	0.10	0.13	0.16	0.11	0.17
Mg	0.045	0.055	0.043	0.047	0.053	0.065
Ce	0.021	0.026	0.015	0.019	0.022	0.019
La	0.009	0.011	0.007	0.008	0.009	0.009
Bhn	197	197	200	207	197	229
Tensile	79,500	84,500	92,000	95,000	91,900	92,000
Yield	61,200	63,600	81,250	76,500	66,450	79,600
Elongation	10%	11%	8.5%	7.0%	7.0%	3.0%

This Cupola Benefits Foundries by Beneficiating Iron Ore

C. McGlone/*Manager*
Cupola and Accessories Div.,
Whiting Corp.
Harvey, Ill.

The modern-day cupola is indeed a versatile tool of industry. Not only does it provide molten metal for most of our gray iron castings but the pig iron charge itself owes its very existence to a unique cupola operation by Rhude Media Co., Marble, Minn. Their product is a fine iron powder used to beneficiate the low-grade iron ores of the Mesabi Range.

This powder comes from crushing pellets produced by pouring molten cupola iron into a stream of water. The iron powder is shipped to Minnesota iron mines, where it is mixed with water to form a heavy density liquid used in the flotation process that upgrades poor ore into ore suitable for blast furnace use.

Selective flotation is called the "high density or heavy media process" and relies on the fact that iron is much heavier than silica. Low-grade ore containing 25 to 30 per cent silica is mixed with the heavy density liquid. Since its density is halfway between silica and iron oxide, the silica floats to the top and the iron sinks to the bottom. This process has been found to be effective in concentrating all but the toughest rock and as such has extended America's ore-producing potential indefinitely.

The Rhude Media foundry is equipped with a No. 7 cupola, a special 22-1/2 in. by 116-3/4 in. U-ladle with an oil-fired preheater, and a skip-hoist charging system equipped with two cone-bottom charging buckets. The melting department is kept operating smoothly with only four men—one on charge makeup, one on the charging system, one melter at the cupola, and one at the U-ladle.

Predetermined amounts of automotive scrap and other charge components are shoveled by hand into the charging bucket. The touch of a ground-level button actuates the charging mechanism which lifts the bucket to charging level.

Another button moves the bucket into the cupola, a third moves the emptied bucket out of the cupola, and a fourth button lowers it for refilling. The operator, even though he remains on the ground, has positive control of the bucket's movement at all times. A second bucket can be filled while the other is charging, should uninterrupted charging be required. At present, Rhude Media is melting at the rate of about seven tons per hour.

Molten iron flows from the cupola spout into the U-ladle. This in turn is tapped into a smaller transfer ladle. Instead of pouring the molten iron into molds to form cast products, the transfer ladle is emptied through a small opening in the pouring platform. The molten metal falls into a water bath which instantly solidifies the iron into tiny pellets.

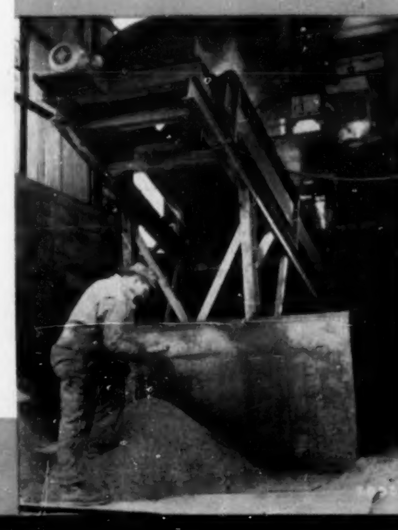
A screw conveyor is set on an incline with its lower end below water level at the pouring point. As the screw revolves, it picks up the pellets and moves them up and away from the pouring point. Gravity allows the water to run down from the pellets and back to the bath. As pellets approach the upper end of the system, they drop through an opening, are collected, and finely ground to face-powder consistency. It is in this form that Rhude Media iron is shipped for use in the heavy density beneficiation process at the mines.

The importance of this process is indicated by the fact that blast-furnace operators estimate that for each percentage point reduction in silica, they save 26 cents per ton of pig iron. Also, reduced silica means less limestone and coke are required in the charge. Thus the product of this cupola is contributing substantially to the profitable operation of cupolas in foundries throughout the country.

Beneficiation is enabling America's mines to keep pace with accelerating industrial demands and is greatly stretching this country's ore reserves. As such, the work of foundries like Rhude Media Co. is not only unusual, but vitally important as well.

Cupola melts scrap to produce iron powder that upgrades low-grade ore.

Transfer ladle pours metal into a water bath to form pellets of iron.



Iron pellets produced by process will be ground into fine powder.

Repair-Welding . . .

First Aid for Foundry Equipment

L. D. Richardson/
Eutectic Welding Corp.
Flushing, N. Y.

New techniques and improved welding filler alloys are now restoring damaged equipment, effecting savings in down-time and parts impossible a few years ago.

A modern foundry costs a great deal of money to equip. The foundry engineer must exercise every ingenuity to maintain this equipment in order to justify the high capital investment involved. Ever increasing labor and materials costs accelerate the losses incurred by equipment failure resulting from wear and breakage. When one part fails due to wear or breakage, a great deal more than that one part is effected.

Often wear and breakage can bring about a host of evils which follow in the wake of equipment failure, including lost production, upset schedules, costly replacement parts, dismantling, and a waste of manpower brought about by delay.

An effective maintenance weld-savings program can aid in reducing these losses by rapidly restoring damaged equipment to productive service, thereby eliminating down-time and replacement costs. Obviously, welding cannot be considered a panacea for all problems, but new techniques and improved welding filler metals make it possible for the foundry engineer to effect savings today which were impossible a few years ago.

Perhaps the factor which has most limited the scope of welding in foundry maintenance in the past has been the high base-metal heat input which welding has historically required. Since foundry operations involve high heat, heavy impact, friction, wear, and tension in service, it is obvious that soldering and brazing would have only limited application.

Fusion welding, since it involves high heat and melting of the base metal in application, often results in warpage, stress, grain growth, hydrogen pick-up in the weld zone, poor machinability, and undercut. Because of the high heat involved, dismantling is often necessary, considerable operator skill is necessary and the cost of repair becomes excessive. These factors have tended to place definite limitations on the use of fusion welding in foundry maintenance.

A relatively newer process of welding has been found to offer numerous advantages when compared to fusion welding, brazing, or soldering, as a foundry maintenance tool. This process utilizes special low-melting non-fusion filler alloys of a proprietory nature. Research on this development was initiated by the late J. P. Hughes Wasserman, a Swiss metallurgist, and continued by his son, Rene D. Wasserman, in American, German and Swiss laboratories.

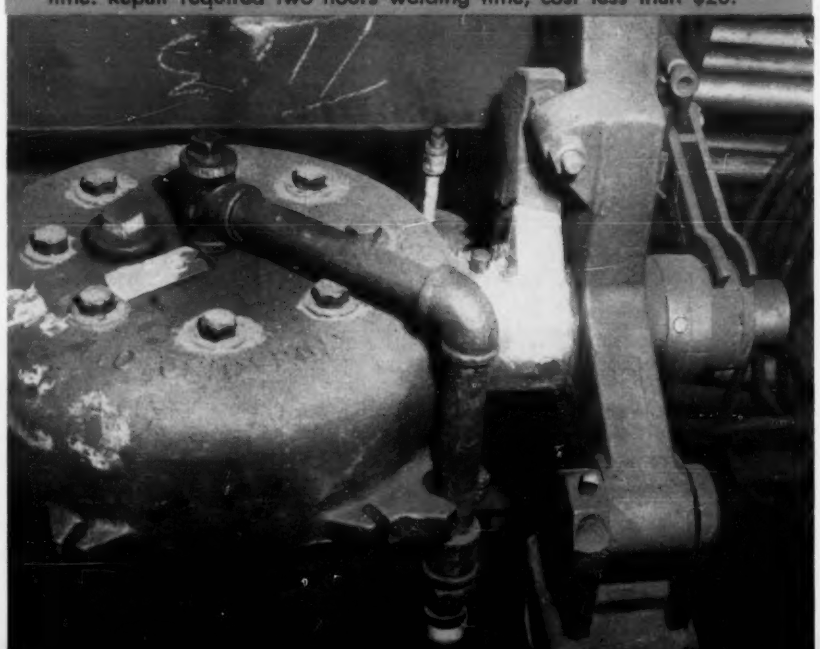
Basically, the process makes practical application of the phenomena of surface alloying wherein a welding alloy with an especially engineered affinity forms an exceedingly strong bond with the unmelted base metal work piece. This process produces the desirable results of fusion welding, such as high strength, elongation, etc., with a definite minimization or elimination of the harmful results such as, warpage, stress, and excessive welding costs arising from high heat input.

Typical examples of weld savings applications which have been proven practical in the foundry follow:

Rollover Machine Repair

In foundries where high output

Fig. 1 . . . Rollover cylinder-head arm broke off completely. Foundry engineer decided to use repair-welding to avoid loss in production time. Repair required two hours welding time, cost less than $20.



demands assembly line mechanization, the rollover machine often plays a vital role. When the heavy arm of the cylinder-head on a rollover machine broke off completely in a Philadelphia foundry recently, this firm was faced with the possibility of a time and money loss which might have been incurred by an idle machine waiting for a new replacement part. The foundry engineer, however, managed to place the machine back in operation in about two hours welding time, at a total cost of less than $20.00. The finished repair is shown in Fig. 1.

To make the repair the fractured parts were first beveled to form a double V and then clamped into alignment. No preheat was used. A suitable low-melting, nonfusion welding alloy was then applied with an oxyacetylene torch, using a brazing technique, at a temperature hundreds of degrees less than brazing would have required. Subsequent beads were applied until the chamfered area was filled flush. Particularly noteworthy is the fact that the low heat input obviated any cracking or distortion of the cylinder head during welding.

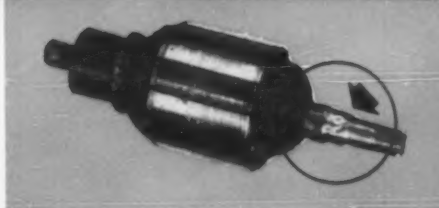
The bronze filler metal used provided a dense, tough, yet machinable high strength deposit. After weld repair this rollover machine has been in service 18 hours per day for 18 months with no indication of failure. This filler metal has many other applications in the foundry. Gear teeth on tumbling barrels and sand hoppers, bosses broken off cast iron machine parts, worn bearings and tangs broken from high-speed drills in the machine shop can all be built up to their original dimensions by weld metal deposition.

Electric Apparatus Repairs

A modern foundry operates on electric power. Thus any program of economy must include the economical repair of electrical apparatus. The armature shown in Fig. 2 is a good example of salvage by welding build-up technique. The usual procedure would have been to press the worn shaft out and insert a new one. A rewinding job, costing nearly $200 for a medium horsepower motor and several days' time would have accompanied this action. Instead, the shaft was overlaid with a "nonfusion bronze alloy," machined and returned to service.

The entire operation required but two hours' time, saved the shaft and circumvented the rewinding job. The cost of the welding alloy required was approximately thirty cents.

Another armature, shown in Fig. 3, failed in service because excess heat of service had caused the rotor bars to become disconnected from the ring. This squirrel cage rotor has been rebuilt with a silver-bearing self-flushing alloy especially developed for electrical apparatus. It requires only low application heat of a gas torch for bonding and has 97 per cent of the electrical conductivity of copper. The alloy is free-flowing, allowing a thin, uniform film of filler metal to be deposited, thus preventing the possibility of over-balancing the motor.



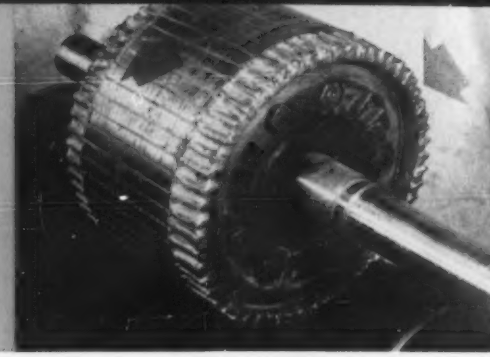


Fig. 2, 3 . . Welding build-up repaired these armatures; (above) shaft overlaid with bronze alloy, (right) rotor rebuilt with self-fluxing alloy.

Since this alloy is applied without flux, a resistivity from flux corrosion is not encountered. Other typical foundry repair applications for this brazing-type alloy are: building up contact points on furnaces and cranes; making electrical connections; and joining bus bars.

Repairing Heat and Wear-Resistant Steel

The excessive wear and abrasive conditions encountered in a foundry often require the use of highly alloyed steels such as heat-resistant and wear-resistant steels. These high-alloyed steels have long been considered difficult and often impossible to weld, particularly to dissimilar steels. This is due to their crack sensitivity, unique co-efficient of expansion and contraction, grain growth, and martensitic zone formations adjacent to the weld.

These steels are now electric arc welded without failure with an all-purpose alloy having low base metal heat input and unique deposit structure of ferrite in an austenitic matrix. In addition to its noncracking characteristics this electrode lays down metal with 120,000 psi tensile strength and high heat resistance.

Typical foundry repairs suited to its use are: 1) joining of wear plates on oscillating conveyors and wear plates in abrasive cleaners; 2) joining annealing equipment, such as annealing racks, in malleable iron and steel foundries; 3) joining crane rails and monorails; 4) welding crane booms; and 5) joining tool steel such as core rod shear blades.

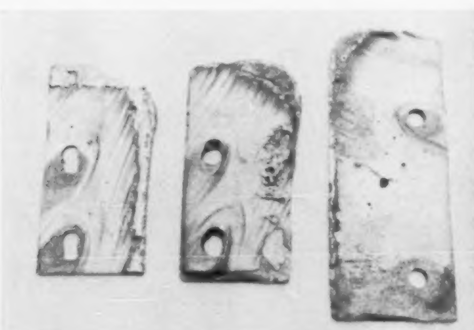


Fig. 4 . . Muller plows lasted only three days until surfaced with an abrasion-resistant alloy imbedded with tungsten carbide particles. Illustration (left) shows plow overlaid with conventional materials after 102 hr's service; blade on right, overlaid with nonfusing alloy, after 950 hr; and similarly treated blade (center) after 5000 hr of service.

Fig. 5 . . Blades described at left operate under these highly abrasive conditions.

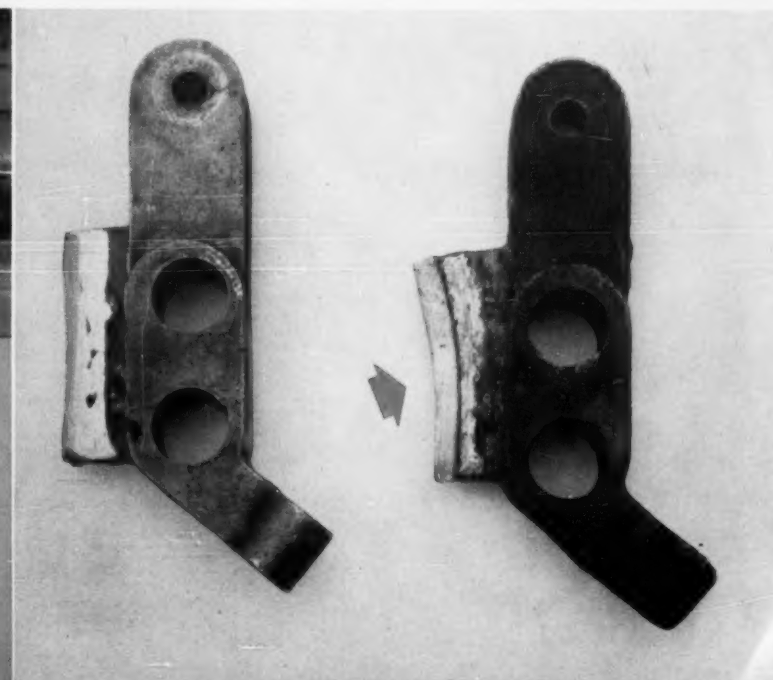


Fig. 6 . . Bronze shoe (right) shown beside same shoe before welding repair. Rebuilt shoe said to outlast new 6 to1.

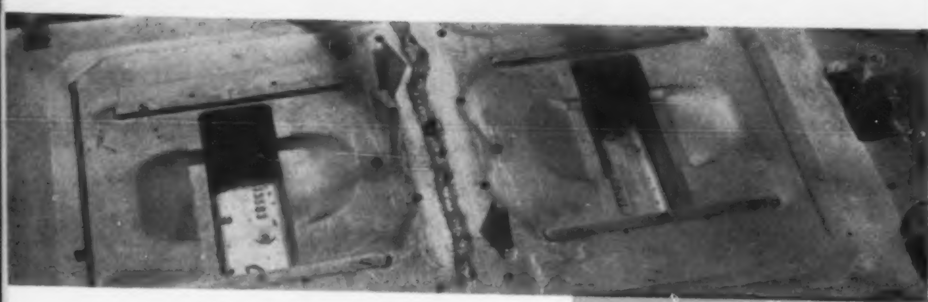


Fig. 7 . . Electrode has beveled crack in aluminum plate for welding in fraction of the time grinding would require.

Weld Repairs for Shock Resistance

While serious repair problems undoubtedly lie in the area of these highly alloyed steels, the joining of mild and low-alloy steels can often cause production time losses through down-time. A typical example is the repair of a steel flask.

In the writer's experience with mild steel electrodes which are commonly used for flask repair, it is impossible to weld a steel flask without the joint failing through weld rupture in a short service period—unless the flask is annealed. Annealing is a costly and time-consuming operation, particularly if the flask is large. Several foundries, using the new all-purpose low hydrogen electrodes, have found that steel flasks can be welded and require no annealing for failure-free service.

This special all-position electrode has a resistance to underbead cracking and high physical properties. Such electrodes are suitable for applications where extreme shock and vibration are present, as in joining grates on a shakeout machine which have become disengaged in service. Low heat of application makes these electrodes particularly well suited for joining thin sheet metal used in ventilation equipment.

Wear Resistant Overlaying

In few industries is the cost of metal wear so notorious as in the foundry. Any program for foundry economy should concentrate on the extension of service life of equipment through wear resistant overlaying. While this process has long been used in the foundry, the savings possible have not generally been fully exploited.

Wear takes on many forms, such as abrasion, impact, scaling, friction and corrision. An overlaying technique which would be ideal to resist extreme abrasion would almost certainly be unserviceable in resisting impact. Many engineers believe hardness of a welding alloy is indication of ability to withstand wear. This is quite often not the case.

Fig. 8 . . Cast iron flasks can be rebuilt even though fractured to extent of this one above.

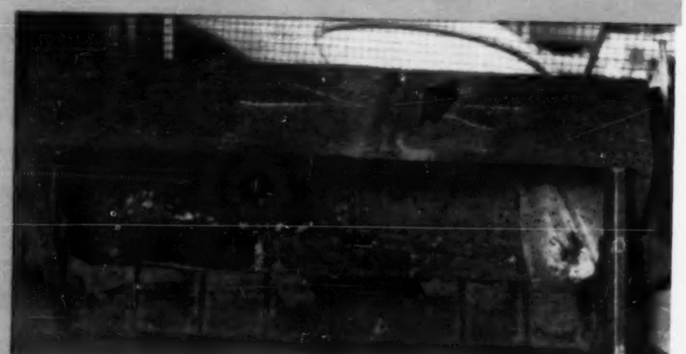
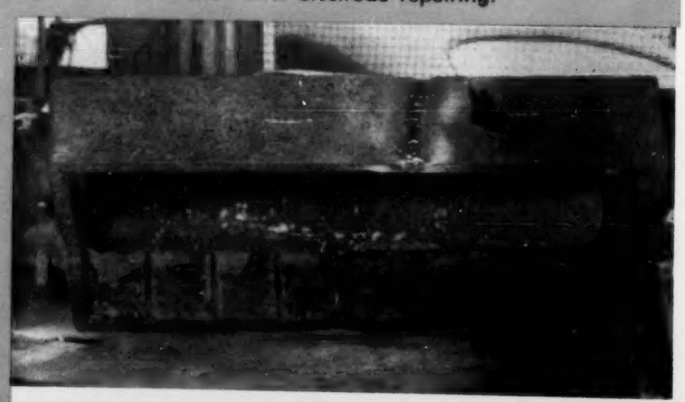


Fig. 9 . . Iron flask after electrode beveling.

Fig. 10 . . Same flask after electrode repairing.



To a surprising degree the ability of a welding alloy to withstand wear depends upon the heat of application required in depositing the alloy. This is due to the often overlooked fact that high application heat results in dilution of the relatively softer base metal with the hard facing alloy. Conversely, the hard surfacing alloy is softened by diffusion so its ability to combat wear is curtailed.

Consequently, the lower the application heat, the longer will be the service life and over-all economy. The case histories which follow are based on the use of special low-melting filler rods developed specifically for the rugged wear resistance needed in various foundry applications.

Illustrative of the savings possible with wear resistant overlaying in the foundry is the application of this process to muller plows by a Michigan steel foundry. This foundry encountered such severe wear that production constantly suffered. A new plow would last only three days. Many attempts were made to hard face, but the most successful attempts only added two days to their service. Costs were mounting disproportionately because many hours were consumed tearing down the muller and reassembling it every few days.

The problem was solved by surfacing the plow with a highly abrasion resistant alloy with tungsten carbide particles embedded in it. The first set of plows lasted four weeks after this treatment. Later tests were even more successful. Fig. 4 shows, on the left, a muller plow overlaid with conventional materials, after only 102 hours' service. The blade on the right, which was overlaid with a special nonfusing alloy, has been subjected to 950 hours' service. The center blade, similarly treated, has experienced 5000 hours' service. While the blade body has worn, the deposit is still intact.

Figure 5 shows the highly abrasive conditions under which the

Continued on page 54

two basic lessons in

WOOD PATTERNMAKING

for foundrymen, designers, patternmakers

Wood for Patternmaking

New Tentative Standard Pattern Colors

Wood patternmaking has become almost the last outpost of craftsmanship left in the foundry industry. With modern technology bent on eliminating homo sapiens from the industrial production line it is rather refreshing and reassuring to find a spot where the human hand is still very much in evidence.

And the hands of the patternmaker are creating an original masterpiece—a master pattern. It seems highly appropriate to find these artisans working with wood—a material that also lives and grows and maintains its position of importance in spite of competition from synthetics.

Most of the new foundry processes are predicated on the basis of making castings faster, cheaper, better and to closer tolerances. As requirements for closer tolerances and higher production increase in the foundry, the demands on pattern engineering multiply. It is a truism that a casting can be no more accurate than the original wood pattern.

With the publication of the new tentative standard pattern colors in this Wood for Patternmaking Bonus Section of Modern Castings, it was considered appropriate to review some of the fundamental considerations associated with the selection and preparation of wood for today's pattern shops.

The last page of this report puts on display some of the outstanding examples of wood patterns that demonstrate the skills of young apprentice patternmakers. These patterns were all winning entrees in the annual Robert E. Kennedy Memorial Apprentice Contest, sponsored by the American Foundrymen's Society. AFS has established this contest as a demonstration of belief in the importance of insuring a continuing supply of skilled technicians to the wood patternmaking industry.

WOOD FOR PATTERNMAKING

SELECTING THE TREE

A general classification of pattern lumber divides itself into two categories – soft wood and hard wood. In both classifications the best wood comes from mature trees. As it ages, wood becomes compact because sap wood changes to hard wood. The qualities of good pattern lumber are: close, even grain; minimum warpage; workability; and freedom from loose knots, pitch and excessive sap.

Soft Wood

In the category of soft wood pattern materials, there are three species of pine which enjoy popularity. These are northern white pine, Idaho white pine and sugar pine.

The northern white pine is moderately light in weight, approximately 2100 lb per thousand board ft, moderately low in strength, and usually straight grained. The soft, uniform texture of the virgin growth has won for it extensive use in building fine patterns. This specie of pine changes dimensions but little with changes in moisture content and is easily worked to a smooth surface. It does not warp, shrink or check so much as most other woods. White pine's glue-holding qualities cannot be excelled and no other wood can be more easily penetrated and secured with nails and screws.

Sugar pine is similar in appearance and properties to northern white pine; however, it is somewhat softer and will not carve as smoothly with hand tools, especially on end grain.

Idaho pine resembles northern white pine very closely. It is a trifle harder, a little more difficult to work and is somewhat heavier –about 2300 lb per thousand ft. It will swell and shrink a little more than northern white pine with changes in moisture content.

Redwood is a straight-grain wood, light in weight and easily worked. It is subject, however, to splitting; therefore its use in patternmaking is restricted because it is not regarded as durable enough to stand hard foundry treatment.

Hard Wood

With reference to hard wood, mahogany is usually considered to hold the upper hand. There are about 35 different kinds of wood called mahogany but only three distinct species–Central American, Mexican and Peruvian. Central American and Mexican mahogany are almost identical in texture, weight and hardness. They are most often used in American pattern shops. Peruvian mahogany is somewhat closer grained, harder, and weighs more than the other two mentioned, 3800 lb per thousand ft. All three species have about the same shrinkage and swelling characteristics in various humidities.

A softer mahogany, which is less dense in texture, is known as baywood. Baywood is less expensive than quality mahogany and has good qualities for patternmaking. The wood is durable but bleeches when exposed to sunlight, instead of becoming darker as other mahogany does.

Wild black cherry is very dense and hard, and has relatively low shrinkage properties. It is an excellent wood from which delicate patterns are made. When cut with a sharp tool, the surface is smooth and glossy.

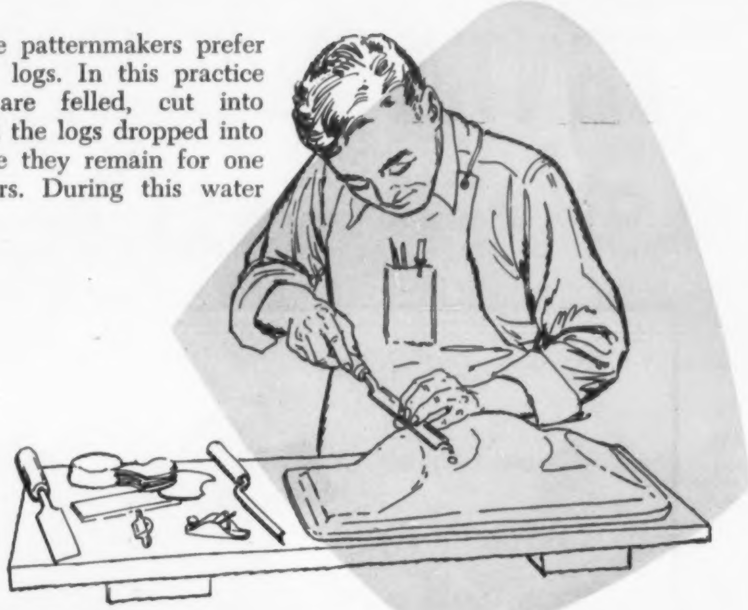
Hard woods such as mahogany and cherry are used for patterns which are subject to rough usage and from which numerous sand molds will be made.

Basswood is one of the softest of the hard woods and very flexible. Basswood is occasionally used in patternmaking, especially for stays in the construction of large curved and twisted patterns, core boxes, etc.

Comparing the life expectancy of wood patterns made from the various trees, one finds that mahogany usually outlasts pine three to one; cherry usually outlasts pine five to one; walnut usually outlasts pine five to one; maple usually outlasts pine eight to one; and birch usually outlasts pine eight to one.

SEASONING WOOD

Just specifying the specie of tree for your pattern supply is not sufficient. One of the most important considerations is the manner in which the wood has been seasoned. Some patternmakers prefer water-cured logs. In this practice the trees are felled, cut into lengths, and the logs dropped into water where they remain for one or two years. During this water



curing, resinous material is extracted and the wood is cured. Lumber cut from water-cured logs will be more mellow, free of strains and will dry much faster.

SAWING LOGS

When a log is sawed into boards, the tendency of the boards is to warp or curl from the side that was toward the heart of the log. This is because a greater amount of shrinkage takes place in the wood tissue toward the outside of the tree. A board cut from the center of the log, having an equal distribution of the growth-ring segments, is likely therefore to remain straight. Boards having an irregular grain are not to be depended upon to retain their form and therefore should be avoided. There are two general methods of sawing logs—flat sawing and quarter sawing. Flat-sawed lumber is sawed tangentially, that is, nearly tangent to the annular rings. It has a tendency to warp, becoming convex on the side that was toward the inside of the tree, as the result of greater shrinkage of the wood toward the outside of the tree.

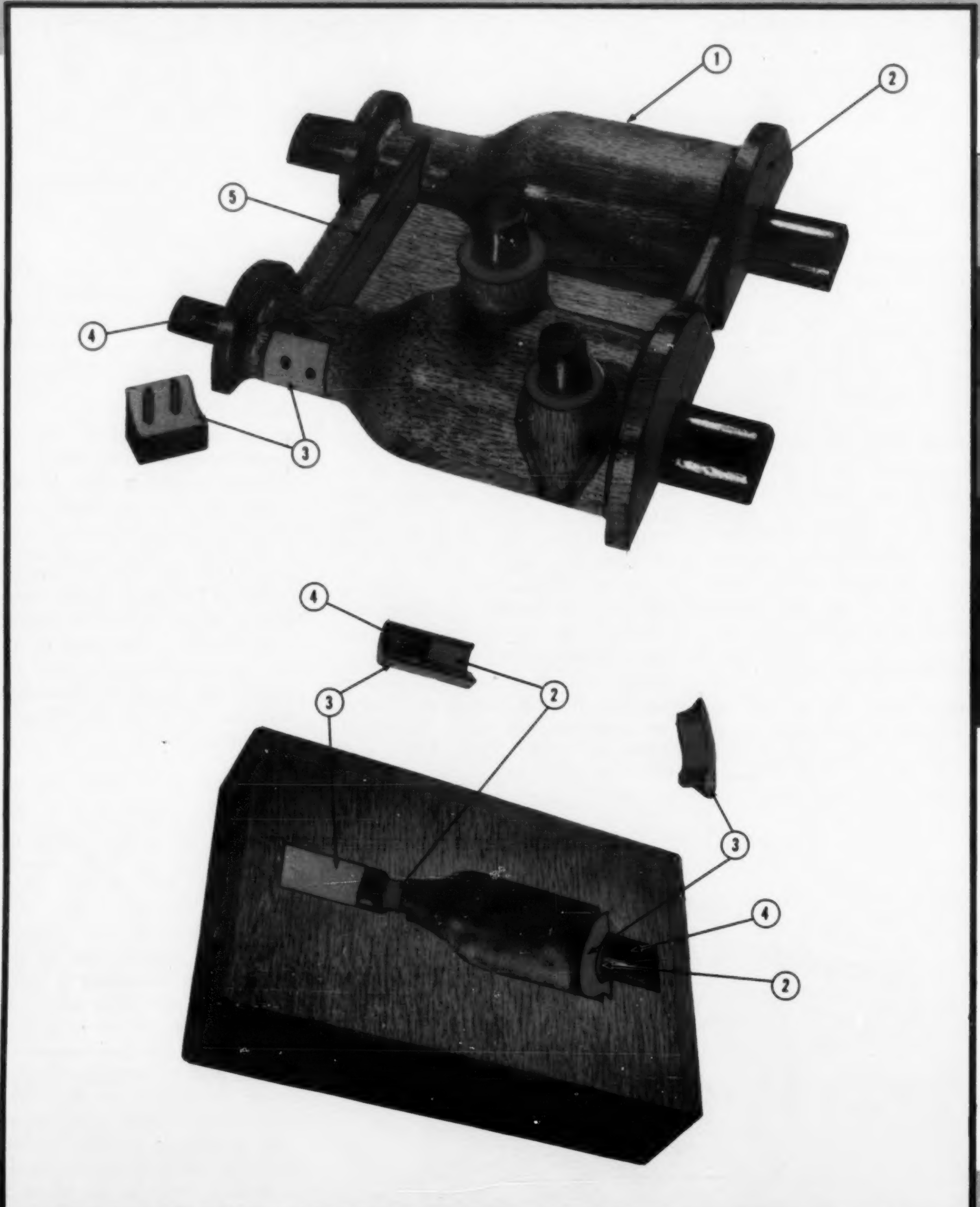
Quarter-sawed lumber is sawed radially, that is, as nearly as possible parallel to the medullary rays of the wood. The log is first cut in quarters and these quarters are sawed into lumber. Quarter-sawed lumber warps much less than flat-sawed lumber. The grain of quarter-sawed hardwood is usually distinctive and beautiful. However, its value lies in its low shrinkage and warping qualities.

AIR DRYING LUMBER

To prevent distortion, a board should lie flat while drying. Even if the board is well seasoned, planed straight and true, if it is laid in contact with a flat surface for any length of time the upper surface will tend to curl or warp. This is due to the upper or exposed side drying out more freely than the underside, which is protected from the air. For this reason, after planing to thickness, boards should always be placed so that the air may circulate freely about them.

To season or air dry lumber it should be carefully stacked in sheds in such a way as to allow free circulation of air around all surfaces. This can be accomplished by piling with strips between each layer or tier. The strips are evenly

TENTATIVE STANDARD PATTEF
FOR NEW PATTERNS



Display these standards prominently in your plant

American Foundrymen's Society, G

RN COLORS

New patterns should be painted in accordance with the standard practice recommended by the Pattern Colors Committee, Pattern Division, of the American Foundrymen's Society.

Specific color locations are numbered on the illustration on the left.

1. *Unfinished casting surfaces, the face of core boxes and pattern or core box parting faces are to be painted with a clear coating.*
2. *Machined surfaces are to be painted red.*
3. *Seats of and for loose pieces are to be painted aluminum.*
4. *Core prints are to be painted black. In the case of split patterns and where cores are used, it is further recommended that the core area be indicated in black,*
5. *Stop-offs are to be indicated by green.*

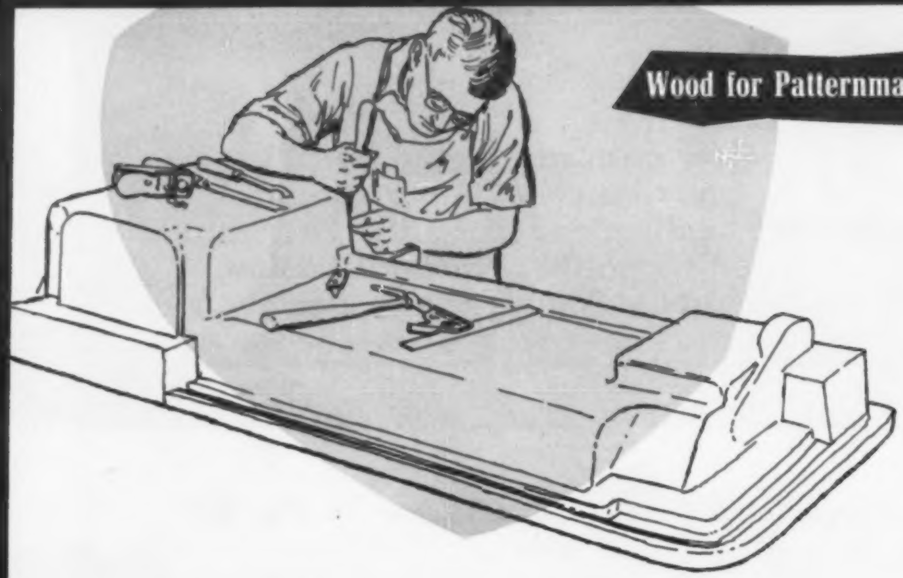
These tentative standard wood pattern equipment colors have been prepared and are recommended by the Pattern Division of the American Foundrymen's Society for use on new equipment. The use of a clear coating on surfaces as indicated will serve to disclose the quality of material and workmanship used in their construction. Likewise, important layout and centerlines used by the patternmaker will not be obliterated and will be available for further reference.

Written comments relating to these Tentative Standards are solicited by the Pattern Division of the Society and should be addressed to the technical director at national headquarters.

olf and Wolf Roads, Des Plaines, Illinois

Adopted by the Pattern Division of AFS - 1958

Wood for Patternmaking



placed, approximately four feet apart. Care is taken that each strip is exactly on top of the one under it, in order that the boards will have perfect support. About one year for every inch of board thickness is required to bring lumber down to the moisture content of the average humidity surrounding it. With three or four-in. thick lumber, it is recommended that drying be retarded by limiting air circulation to prevent checking which comes when it drys too fast.

The average moisture content of a thoroughly seasoned piece of white pine is anywhere from 10 to 14 per cent, depending upon the locality in which the seasoning takes place.

For patternmakers to use air-dried lumber with any degree of satisfaction, it should be piled again on strippers in the pattern shop and left to acclimate anywhere from six months to two years, depending on its thickness.

European Practices

In Europe, patternmakers' lumber is very carefully prepared. After sawing, the log is put back together in the order of cutting, with the boards separated by strippers to allow for air drying. The reason for this is that the wood from the various parts of the log expands and contracts at different rates. Making a single pattern, the Europeans use adjacent boards to minimize these expansions and contractions and thus improve their accuracies. They allow a minimum of one year per inch for outside curing and a minimum of six months in the shop itself.

European patternmakers in general take better care of their wood. They keep it in their shops for a longer period of time than most American shops do. They realize that upon the acclimatization of lumber in the shop depends its shrinkage and therefore the final accuracy of the pattern.

KILN DRYING

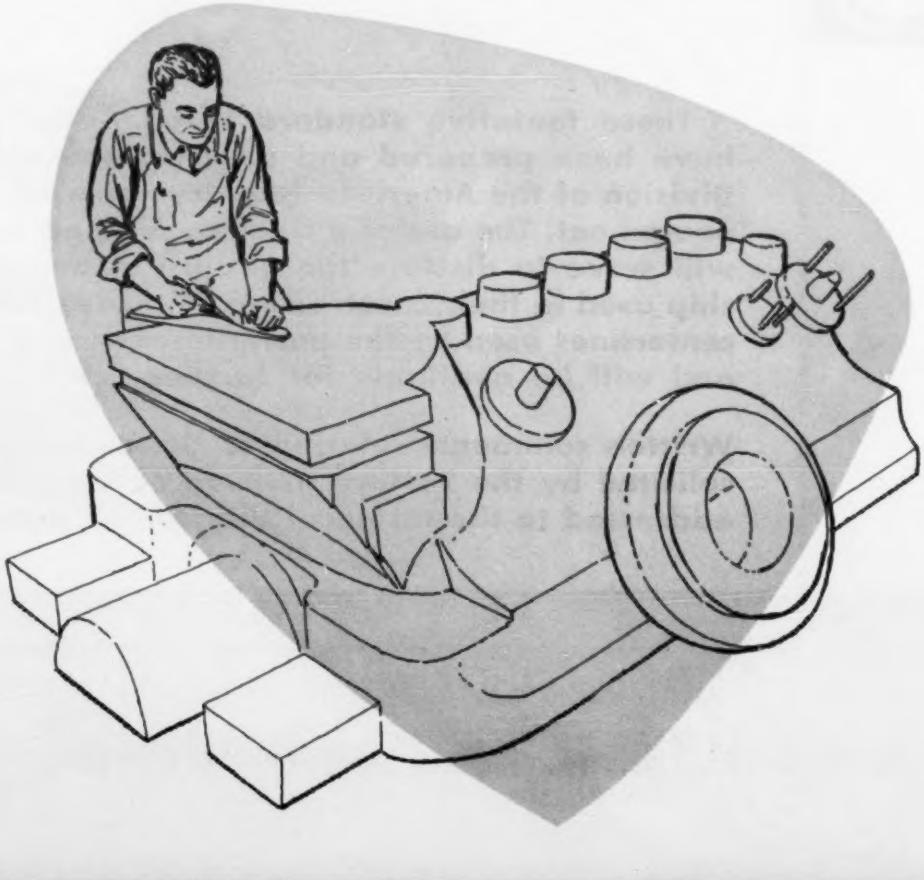
Most of the pattern lumber used today has been rapidly kiln dried rather than slowly air dried. Kiln-dried lumber is lumber artificially dried quickly by placing the boards in a specially designed oven called a kiln. Within two or three weeks the lumber is ready for use. Whereas air drying reduces the moisture content of wood down to about 25 per cent, kiln drying lowers the moisture content to the low level of four to six per cent.

When lumber is put through the kiln it shrinks in measurement from three to five per cent, depending on the moisture content of the lumber when it enters. Air-dried lumber is said to be superior to kiln-dried lumber because the rapid drying in the kiln destroys much of the elasticity of the wood fibers.

WOOD SHRINKAGE

Wood naturally shrinks and expands according to the atmospheric conditions which surround it. Given enough time, the moisture content of the pattern lumber should adjust itself to equal that of the surrounding atmosphere. Well seasoned pattern lumber is constantly going through the process of moisture absorption or moisture evaporation to agree with the rising and falling humidity of the pattern shop in which it is stored.

During winter months when windows and doors are closed and dry artificial heat is used, pattern shops become extremely dry. If properly seasoned lumber is brought into the pattern shop dur-



ing the winter it will actually seem wet and will, in the process of rapid drying, undergo shrinkage and consequent checking.

Wood shrinks most in the direction of the annual growth ring, tangentially, commonly called flat grain, and about one-half to two-thirds as much across these rings, radially, called edge grain. Practically no shrinkage or expansion takes place longitudinally except when a board is excessively cross-grained, and lengthwise shrinkage is a combination of crosswise and longitudinal change.

GRADING LUMBER

Lumber is graded into several classifications, indicating its quality. The grade of a board is based on the number, character and location of such defects as knots, mineral streaks, pitch pockets, rot (sometimes called doze), checks, shake and stain. Standard grading rules for sugar pine and Idaho pine are published by the Western Pine Association, Portland, Ore. The Northern Pine Manufacturers Association, Minneapolis, publishes a book on grading rules for northern white pine. All mahogany lumber is graded under the rules of the National Hardwood Lumber Association, Chicago.

The dimensional specifications of lumber are generally given in the following order: thickness, width and length. The width of a piece of lumber is the distance across the grain from one edge to the other. The length is the distance with the grain from one end to the other. The practice of specifying lumber in this order will eliminate errors which might otherwise arise.

The quantity of lumber purchased is calculated in board feet. A board foot is one inch thick, one foot wide and one foot long. To determine the board feet in a piece of lumber the thickness in inches is multiplied by the width in feet by the length in feet.

USE OF PLYWOOD FOR PATTERN WORK

Douglas fir plywood of many thicknesses and sizes is being used today in pattern shops. Many grades of plywood are now available with plastic coatings to make them hard and impervious to sand, release agents and other compounds encountered in the foundry. Although plywood is in itself a laminated structure, it in turn can be built up to unlimited thicknesses by laminating individual plywood sheets to each other. Since the grain of the wood is usually alternated in plywood, the material is unusually stable. Plywood is also convenient to use for templates and checking guides.

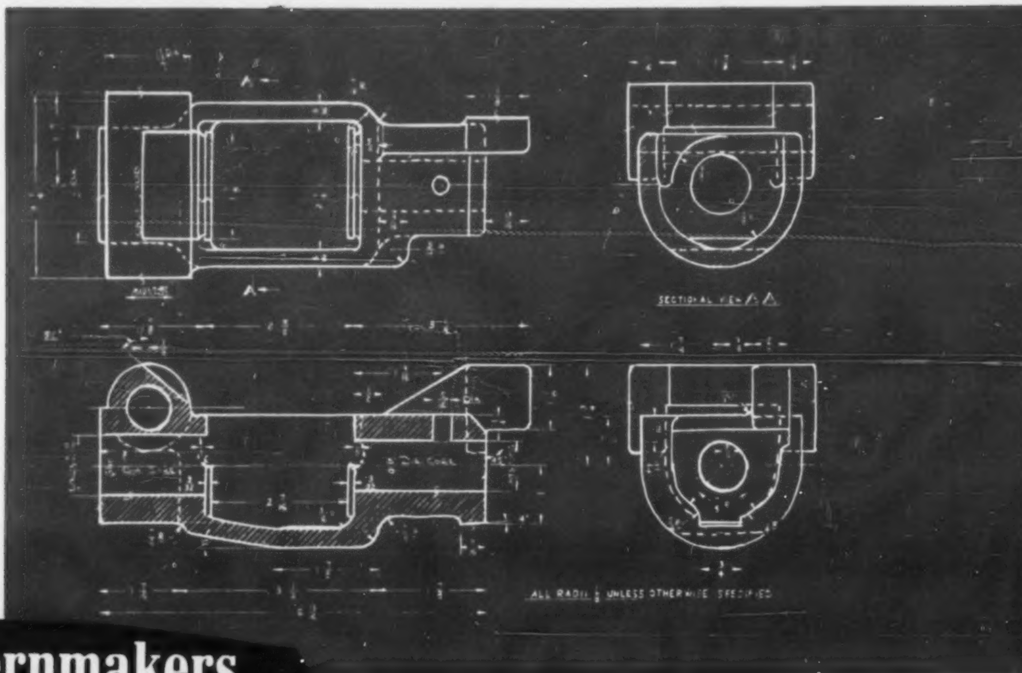
NEW STABLE PATTERN WOOD

This constant problem of swelling and shrinking of wood patterns may have been solved by a recently developed product. Known as plastics-impregnated mahogany laminated board stock, it is said to neither swell nor shrink under the influence of atmospheric moisture. The extreme stability of this pattern materiel is making a popular substitute for natural wood. Very accurate models made with this plastics - impregnated mahogany show exceptional stability.

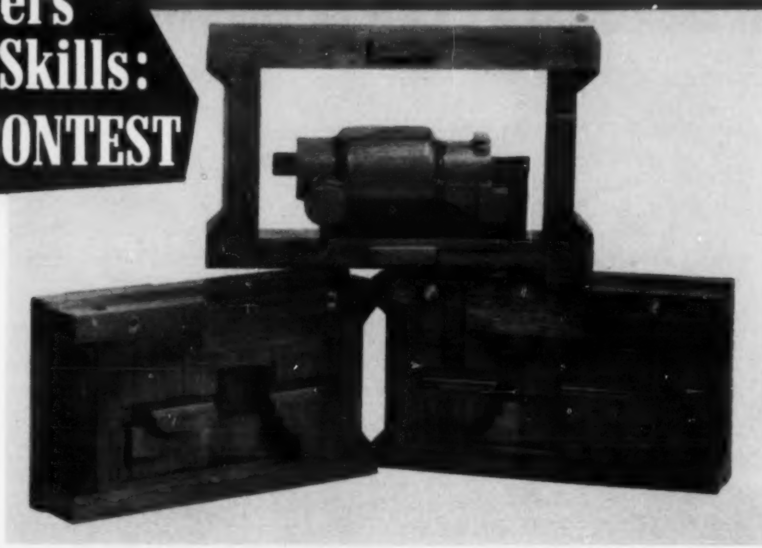
CONCLUSION

Most of the information contained in this Bonus Section has been abstracted from the PATTERNMAKER's MANUAL, published by the American Foundrymen's Society. This book contains 288 pp with 197 illustrations and is recommended reading for details on many other phases of patternmaking.

Turn over to the last page of this report and see some examples of wood patterns that won national recognition in annual contests held by the AFS for apprentice patternmakers.



Where Patternmakers Show Their Skills: AFS APPRENTICE CONTEST



This wood core-box reflects an apprentice patternmaker's ingenuity. The two-piece core box is a "booking type" which permits the two core halves to be joined by closing the box. This practice eliminates the operation of pasting together a two piece core. The bedding frame resting on top of the core box is used to form a green sand dryer. The one-piece booked core is rolled onto this sand dryer for support during baking.

■ Competition in the wood patternmaking division of the 1959 AFS Robert E. Kennedy Memorial Apprentice Contest is now underway. Closing date for the competition is March 16, 1959.

Any apprentice learner or trainee in the metalcasting industry who has not had more than five years experience in patternmaking is eligible. In addition to the wood patternmaking contest, competition is held in metal patternmaking, gray iron molding, steel molding and non-ferrous molding.

Cash Prizes

Apprentices will compete for cash prizes and certificates of recognition. First place winners in each division of national competition will receive $100; 2d place, $75; 3d place, $50. In addition 1st and 2d place division winners will have their round-trip travel expenses paid to the 1959 AFS Convention in Chicago and receive their awards personally. Certificates of recognition will be presented to all winners in each division.

Judging

Judging is conducted on a point-score basis determined by the Apprentice Contest Committee. Following is the point scoring system for the 1959 contest:

Wood Patternmaking

Accuracy according to drawing	35 max.
Moldability	35 max.
Workmanship	20 max.
Time	10 max.
Total	100 max.

Chapter Contests

All Chapters are encouraged to sponsor local elimination contests. The 1959 Rules and Regulations approved by the Apprentice Contest Committee must apply for all local contests.

The opening session of the 25th International Foundry Congress, held in the **Grand Auditorium** at the Brussels World Exposition. International **President G. Schwietzke** of Germany, delivering the opening address.

Belgium Host to 25th International Congress

by Dr. A. B. Everest / *Mond Nickel Co. London, England, and AFS European Representative*

■ Foundrymen from 26 countries participated in the 25th International Foundry Congress held Sept. 29-Oct. 4 in Belgium. The International Congress, sponsored by the International Committee of Foundry Technical Associations, was held in Brussels and Liege with the Belgian Foundrymen's Association acting as host to 1000 foundrymen and their wives.

AFS Director R. R. Deas, Jr., Hamilton Foundry & Machine Co., Hamilton, Ohio; Prof. J. L. Leach, University of Illinois, Urbana, Ill. and AFS European representative Dr. A. B. Everest, Mond Nickel Co., London, England, served as official AFS representatives to the International Committee of Foundry Technical Societies and its commissions.

Members of the 16-man American delegation took part in the various technical sessions and plant visitations. During the Congress 37 technical papers were presented, including four from the United States and Canada, as follows:

▪ *Adapting Theory to Practice in the Manufacture of Light Metals Castings*, M. C. Flemings and H. F. Taylor, Massachusetts Institute of Technology, Cambridge, Mass., the official AFS Exchange Paper.

▪ *The Relation of Engineering Performance of Castings to Metal Structure*, R. A. Flinn, University of Michigan, Ann Arbor, Mich.

▪ *The Effect of Various De-Oxidizers of Cast Steel*, C. E. Sims, Battelle Memorial Institute, Columbus, Ohio and C. W. Briggs, Steel Founders' Society of America, Cleveland.

AFS Director **R. R. Deas, Jr.**, one of the official AFS delegates to the 1958 International Foundry Congress, leaving the Grand Auditorium of the Brussels World Exposition after official opening session.

▪ *The Effect of Various Factors on the Mechanical Properties of Magnesium Alloy Castings*, J. W. Meier, Department of Mines & Technical Surveys, Ottawa, Ont., Canada.

Simultaneous translations were made in the three official languages, English, French and German by means of radio-type headphones.

Work of various subcommittees was reviewed by International President Dr. G. Schwietzke of Germany who announced that the *International Foundry Dictionary* would be completed in 1960. He congratulated the Committee on Defects on the reception given to Volumes I and II of the *International Atlas of Defects*. The

AFS NEWS and VIEWS

Foundrymen from 26 Countries Attend International Congress

Past Presidents' Committee in action at 25th International Foundry Congress. Left to right: **Dr. Aldo Dacco,** Italy; **A. Brizon,** France; **Max Vuilleumier,** Switzerland; **Dr. Arthur B. Everest,** Great Britain, also new International Treasurer; **F. W. E. Spies,** Holland; **Dr. G. Schwietzke,** Germany; **George Lambert,** Great Britain, International Secretary; **Dr. J. Leonard,** Belgium.

Committee on Methods of Testing Cast Iron continues its work in the preparation of international standards for all types of cast iron.

President Schwietzke spoke on the growing cooperation with the European Committee of Foundry Associations which as a trade body had set up various committees. He also referred to the future work of the committee and advised that new proposals were under consideration to set up permanent commissions dealing with raw materials, properties of foundry metals and alloys and accident prevention.

The Congress was opened in the Grand Auditorium of the Brussels World Exposition by Robert Doat, president of the Belgian Foundrymen's Association and president of the Congress. The opening address was given by International President Schwietzke and followed by P. van der Rest, vice-president of the Federation of Belgian Industries who also welcomed the delegates.

Dr. Schwietzke emphasized that the Congress was meeting under the general theme of "The Foundry in the Service of Mankind" which was linked with the theme of the Brussels World Exposition—"Technical Progress Towards a More Human World."

After the opening in Brussels, the Congress transferred to historic Liege for technical sessions, held in the new Palais des Congres.

Technical sessions were supplemented with visits to leading industrial plants, technical institutes and laboratories in Belgium; and delegates were afforded opportunities to visit the many outstanding exhibits of the Exposition.

The ladies program included visits to points of historical interest in Liege as well as to local industries such as glass and lacemaking and sightseeing tours to the nearby Ardennes country.

Official delegates to the Congress were received in the ancient Palace of the Prince-Bishops of Liege by M. Clerdent, governor of the province. This provided an opportunity for seeing the 16th century palace and council chamber which is still used by the high authority of the district. The organizing committee entertained the official delegates at dinner, and all participants attended the closing banquet.

Robert Doat, president of the Belgium Foundrymen's Association and president of the 1958 Congress, opening the Congress in Brussels.

International officers for 1959 were introduced at the closing session, as follows: President—Dr. Aldo Dacco, Italy; Secretary—George Lambert, Great Britain (re-elected); Treasurer—Dr. A. B. Everest, Great Britain. It was announced that the Vice-President would be nominated by the Dutch Foundry Industry.

The following International Congresses were announced:

1959—Spain, Madrid and Barcelona, Oct. 4-10.

1960—Switzerland, Zurich, Aug. 14-20.

1961—Austria, Vienna, May (tentatively).

1962—United States, Detroit, May 7-11.

1963—Czechoslovakia, Prague.

Prof. A. L. DeSy, University of Liege, Liege, Belgium, was presented with the International Award of Honor in recognition of his many contributions to foundry technology.

President Schwietzke paid tribute to the late Vincent Delport of England for many years the European representative of AFS.

The Belgian Foundry Association was congratulated on the excellent Congress program and arrangements, particularly President Doat, past International President Rene Deprez and Paul de Keyser.

Hungary was elected a member of the International Committee. Other member countries are Australia, Austria, Belgium, Czechoslovakia, Denmark, Finland, France, Germany, Great Britain, India, Italy, Japan, Netherlands, Norway, Poland, Spain, Sweden, Switzerland, United States and Yugoslavia.

Pictures of the International Congress by Photo-Congres.

An outstanding social feature of the 1958 International was a reception in the ancient **Palace of the Prince-Bishops** of Liege, where official delegates were received by M. Clerdent, governor of the province.

The Palais de Congress (right center) in Liege, Belgium, on the banks of the historic River Meuse, where International Congress sessions were held.

Divisions and Committees Direct Technical Affairs

■ Technical affairs of the Society are directed by ten Technical Divisions and nine General Interest Committees. The groups represent the various interests of the metalscasting field and may be altered to reflect the needs of the industry. The two most recent additions are the Die Casting & Permanent Mold Division and the Ductile Iron Division.

Technical Divisions

Each Technical Division consists of a chairman, vice-chairman and secretary. Each is directed by an executive committee consisting of the division chairman, vice-chairman, secretary, immediate past division chairman, chairman of each committee of the division and not more than three additional members at large.

All Technical Divisions have a Program and Papers Committee whose duty it is to prepare a program of technical sessions for the division at the Society's Annual Meeting.

Technical Divisions have at least one Standing Committee in addition to the Executive Committee and the Program and Papers Committee. In addition, the chairman of each division, on advice of his committee, may appoint such sub-committees as may be necessary to progress functions or projects of the committee.

At the discretion of its Executive Committee, a division may appoint an Advisory Group of not more than 12 individuals. They may be called upon to act in an advisory capacity to the Executive Committee but otherwise are not expected to participate actively in division affairs.

General Interest Committees

The General Interest Committees likewise consist of a chairman, vice-chairman and secretary. The chairman may also appoint sub-committees as needed. It is the duty of the General Interest Committees to prepare the committee's technical sessions, if any, at the Society's Annual Meeting.

The activities of the Technical Divisions and General Interest Committees are governed by the Technical Council which consists of the chairmen and vice-chairmen of the Technical Divisions and chairmen of the General Interest Committees.

All members of the Technical Divisions and General Interest Committees are contained in the NATIONAL COMMITTEE PERSONNEL. The 1958-59 roster has been recently published. In addition, the NATIONAL COMMITTEE PERSONNEL lists the AFS Board of Directors, Regional Vice-Presidents, various committees, National Headquarters Staff, Technical Council and technical policies.

Members of the Technical Council are:

TECHNICAL COUNCIL CHAIRMAN–
H. H. Wilder.

TECHNICAL COUNCIL VICE-CHAIRMAN–
Charles E. Nelson.

BRASS & BRONZE DIVISION–
Chairman, R. J. Keeley.
Vice-Chairman, R. B. Fischer.

EDUCATION DIVISION–
Chairman, B. L. Bevis.
Vice-Chairman, R. W. Schroeder.

GRAY IRON DIVISION–
Chairman, H. W. Lownie.
Vice-Chairman, R. A. Clark.

LIGHT METALS DIVISION–
Chairman, D. L. LaVelle.
Vice-Chairman, J. G. Mezoff.

MALLEABLE DIVISION–
Chairman, Eric Welander.
Vice-Chairman, F. W. Jacobs.

PATTERN DIVISION–
Chairman, O. C. Bueg.
Vice-Chairman, J. M. Kriener.

SAND DIVISION–
Chairman, E. C. Zirzow.
Vice-Chairman, L. J. Pedicini.

STEEL DIVISION–
Chairman, A. J. Kiesler.
Vice-Chairman, D. N. Rosenblatt.

DIE CASTING & PERMANENT MOLD DIVISION–
Chairman, D. L. Colwell.
Vice-Chairman, F. C. Bennett.

DUCTILE IRON DIVISION–
Chairman, C. W. Gilchrist.
Vice-Chairman, David Matter.

General Interest Committees

FUNDAMENTAL PAPERS COMMITTEE–
Chairman, J. F. Wallace.

HEAT TRANSFER COMMITTEE–
Chairman, W. K. Bock.

PLASTER MOLD CASTING COMMITTEE–
Chairman, R. F. Dalton.

INDUSTRIAL ENGINEERING & COST COMMITTEE–
Chairman, L. W. Lehmann.

PLANT & PLANT EQUIPMENT COMMITTEE–
Chairman, James Thomson.

REFRACTORIES MANUAL COMMITTEE–
Chairman, J. P. Holt.

CUPOLA ADVISORY COMMITTEE–
Chairman, W. W. Levi.

MANAGEMENT DEVELOPMENT COMMITTEE–
Chairman, C. E. Westover.

SAFETY, HYGIENE & AIR POLLUTION CONTROL COMMITTEE–
Chairman, K. M. Smith.

National News

Howard H. Wilder

Weber Outlines Noise Problems at Symposium

■ Practical noise control in foundries were presented at the 9th National Noise Abatement Symposium held in Chicago during October by H. J. Weber, AFS Director of Safety, Hygiene & Air Pollution Control.

Weber listed four major causes of foundry noise problems: shakeout, tumbling mills, pneumatic chipping hammers and vibrating and pounding equipment.

Two solutions were advanced for reducing shakeout noise. One involves the use of steel chain threaded through radiator hose and placed across the grate to prevent the impact of metal against metal. The other employed the welding of rubberized fabric blocks to shakeout grids.

Suggestions for reducing noise from tumbling mills included placing equipment in sound proof booths if possible and the use of a resilient rubber liner with a steel backing.

Weber stated that the factors encountered in the use of pneumatic chipping hammers made noise control almost impossible. He noted that flame washing for casting cleaning was becoming increasingly popular.

Use of a balloon liner operated by compressed air was given as a solution to moving sand jammed in storage hoppers normally used by vibrators and mallets.

Malleable Division Starts on New Pearlitic Project

■ Investigation has been started by the Pearlitic Malleable Committee of the Malleable Division into *Hardenability of Various Pearlitic Malleable Iron with Alloy Additions and a Comparison of the Resulting Hardenability in Relation to Different Steels.*

The following alloy compositions were selected:

- Base iron plus 0.15 to 0.25 per cent molybdenum.
- Base iron with addition of sufficient manganese to increase the manganese content from 0.70 to 0.90 per cent plus 0.15 to 0.25 per cent molybdenum.
- Base pearlitic malleable iron to which sufficient ferromanganese and ferromolybdenum have been added to increase the manganese content to 1.25 per cent and molybdenum to 0.15-0.25 per cent. The bars are to be subjected to the regular first-step annealing operation and then air quenched.

Several of the members agreed to cast test bars 1-1/8 to 1-1/4 in. in diameter and 6 to 8 in. long. Twelve bars of each alloy are to be cast.

Complete chemistry and heat treatment and other pertinent information is to be sent to Prof. R. W. Heine, Dept. of Mining & Metallurgical Engineering, University of Wisconsin, Madison, Wis.

Choose Test Bars as Theme

■ "What does a test bar mean to the producer and to the user of castings" has been tentatively selected as the subject for the Light Metals Division Round Table discussion at the 1959 Convention.

A panel of three was suggested. One to be a foundry metallurgist, another a specification writer and the third a user.

1959 Technical Papers Outline Lastest in Foundry Research

Meeting of executive committees of Light Metals and Die Casting & Permanent Mold Divisions at 62d Castings Congress.

■ New processes and materials, quality control measures, principles of good casting procedures and summaries of current practices will be presented in technical papers to casting buyers and designers at the 63d Castings Congress.

Each AFS technical division and general interest committee sponsoring technical papers at the Congress has been requested to devote two papers of interest to designers.

Papers are now being reviewed by the Program & Papers Committees of the divisions and general interest committees.

Preliminary information disclosed on papers being considered for approval indicate papers of interest:

. . . The effect of the atomic age on foundry practice, from the viewpoint of utilizing radioisotopes.

. . . Disclosure of a patented die-casting alloy for structural applications requiring good tensile properties and high elongation toughness.

. . . A discussion of the relation between stress concentration in service and castability as measured by the displacement of the thermal center from geometric center junctions of castings.

. . . Presentation of the development of a production bending test method advocated for incorporation into future casting specifications.

. . . Development and application of principles of thermal dynamics for locating gates, risers, and chills to produce sound light-metal castings.

. . . Study of ductility and strength of high-carbon gray irons with ductility measurements made with electric strain gages.

. . . Report on welding and brazing processes used to fabricate and repair cast iron. Will include mechanical properties of welded and brazed joints of cast iron joined to itself, mild steel, malleable iron and other closely related materials.

. . . Development of new reduced pressure solidification test. To determine gas content of melt it is necessary to find only weight of sample.

. . . Description of processes allowing direct reduction of iron ore to molten metal.

Satisfied Exhibitors Lead in Applications for 1959 Show

■ Satisfied exhibitors from previous shows are leading the parade of applications for space in the 1959 Engineered Castings Show. Of those planning to exhibit to date, a heavy percentage represent participants in the 1st Engineered Castings Show held during 1957 in Cincinnati.

"Many of the exhibitors have found that this show, directed to castings buyers and designers, best fits their requirements," says W. N. Davis, AFS Exhibit Manager.

The Show provides an industry-wide display of what the castings industry can produce. Visitors will be shown how castings can be utilized as end products as well as components. Exhibitors will be able to show buyers and designers how to cut costs, production time and means of solving particular problems.

What the Engineered Castings Show means to one exhibitor is summarized by William E. Durack, Magnaflux Corp., Chicago. Says Durack, "The Engineered Castings Show is important to us because it gives us an opportunity to meet the actual buyers and users of castings. By finding out the problems of the casting users, we are in a better position to serve the foundries. In turn, the foundries are better equipped to supply consistent quality and more practical designs to their customers."

Exhibitors have been restricted to four categories:

- Producers of castings for sale.
- Producers of patterns for sale.
- Manufacturers of laboratory, testing and inspection equipment for control of casting quality.
- Producers of metals and alloys inherent in quality castings.

The importance of quality control measures to casting producers and customers was advanced by Durack:

"Testing and design are equally important to the foundries and to their customers. The more knowledge foundry customers have about the design, manufacture and testing of castings, the easier it will be for both to work together for mutual advantage. The result we aim for is better castings at lower cost for both foundry and casting user."

major AFS meetings

DECEMBER

8-12 . . . **T&RI Advanced Industrial Engineering course,** Marquette University Management Center, Milwaukee.
8 . . . **AFS Nominating Committee, Annual Meeting,** Sherman Hotel, Chicago.
9 . . . **AFS Board of Awards, Annual Meeting,** Union League Club, Chicago.
10 . . . **T&RI Trustees, Mid-Year Meeting,** Union League Club, Chicago.

JANUARY

16 . . . **Region 3 Administration Meeting,** Hotel Statler, Cleveland.

FEBRUARY

11 . . . **AFS Board of Directors, Spring Meeting,** Palmer House, Chicago.
12-13 . . . **Wisconsin Regional Foundry Conference,** Schroeder Hotel, Milwaukee. Sponsors: Wisconsin Chapter; University of Wisconsin Student Chapter.
26-27 . . . **Southeastern Regional Foundry Conference,** Hotel Tutwiler, Birmingham, Ala. Sponsors: Birmingham, Tennessee Chapters; University of Alabama Student Chapter.

MARCH

12 . . . **Region 2 Administration Meeting,** Huntington Hotel, Pasadena, Calif.

APRIL

13-17 . . . **AFS Castings Congress & Engineered Castings Show,** Hotels Sherman and Morrison, Chicago.

MAY

21 . . . **AFS Division Meetings,** Executive Committees, Program & Papers Committees, Annual Review.
22 . . . **AFS Technical Council,** Annual Meeting, Chicago.
25 . . . **AFS Publications Committee,** Annual Meeting, Chicago.

JUNE

10 . . . **AFS Board Orientation Meeting,** Central Office, Des Plaines, Ill.
11-12 . . . **16th Annual Chapter Officers Conference,** Chicago.
15 . . . **T&RI Research Committee,** Annual Meeting, Chicago.
18-20 . . . **4th Annual Foundry Instructors Seminar.**
25-27 . . . **AFS-F.E.F. Penn State Regional Foundry Conference,** Pennsylvania State University, University Park, Pa. Sponsors: Rochester, Pittsburgh, Metropolian, Eastern New York, Western New York, Northwestern Pennsylvania, Central New York, Chesapeake, Philadelphia Chapters; Reading Foundrymen's Association; Conestoga Foundrymen's Association; Penn State University Student Chapter.
26 . . . **AFS Exhibits Committee** 1959-60, Chicago.

JULY

20 . . . **T&RI Trustees,** Annual Meeting, Chicago.
21-22 . . . **AFS Finance Committee,** Annual Budget Meeting, Chicago.

AUGUST

6 . . . **AFS Executive Committee,** Special Meeting, Chicago.
6-7 . . . **AFS Board of Directors,** Annual Meeting, Chicago.

Study Additives for Stabilizing Effects

■ Sixteen elements will be investigated to establish their effect on stabilizing the primary carbides to prevent graphitization in heavy malleable sections.

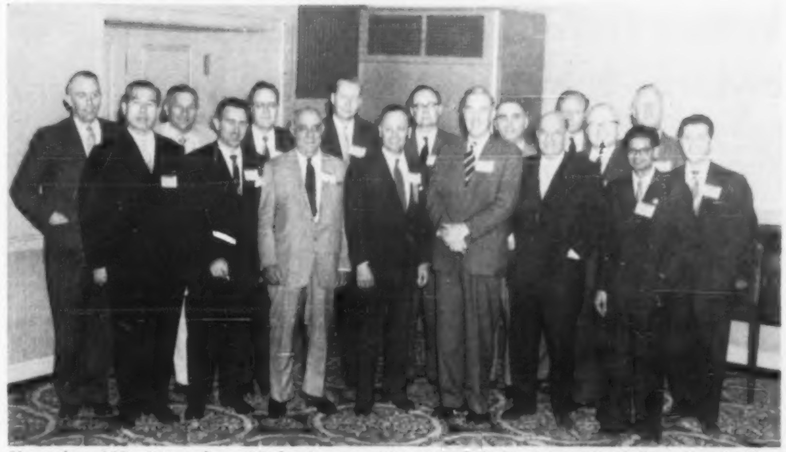
This investigation was recommended by the Research Committee, Malleable Division, in its research project being conducted at the University of Wisconsin, Madison, Wis.

It was recommended that the concentration of these elemental additions be left to the discretion of the investigators but it was suggested they consider a very low concentration as well as a substantial one to get an indication of the extremes.

A summary of the progress report on the study of increased section size of malleable iron castings produced free of graphitic carbon was given at the October Research Committee meeting.

The following elements were suggested for investigation:

Arsenic	Calcium
Lithium	Antimony
Sulphur	Lead
Potassium	Tellurium
Sodium	Selenium
Strontium	Tin
Cerium	Zinc
Barium	Magnesium



More than 100 visitors from 15 foreign countries attended the **International Reception** held at the 62d Convention. Presiding was AFS President Harry W. Dietert, (center). Flanking Dietert on left is Manual Campello from Cuba and on the right is Sir Frank Markham, England.

T&RI Ferrous, Gating & Risering Course Applies Theory to Foundry Practice

■ Principles of gating and risering of malleable, gray iron and steel were outlined at the AFS Training & Research Institute *Gating & Risering of Ferrous Metals* course given Oct. 27-31 in Chicago. The course was a study of basic principles and application to the cast ferrous alloys.

The first portion was devoted to a general study of fundamentals including application of heat transfer principles, solidification of metals, considerations for controlled solidification and fluid flow of metals. Flow patterns in gating systems and mold cavities were explained in part by two AFS films on vertical and horizontal gating, a Battelle Memorial Institute progress report, Naval Research Laboratory film in finger gating and a gating film from the Institute of British Foundrymen.

Gating and risering of malleable iron was explained by C. R. Baker, Albion Malleable Iron Co., Albion, Mich. Gating and risering of gray iron was conducted by Prof. J. F. Wallace, Case Institute of Technology, Cleveland and W. H. Johnson, Battelle Memorial Institute, Columbus, Ohio, presented gating and risering in steel.

Instructor Baker (right) and students.

Charles Locke, Crucible Steel Castings Co., Cleveland, conducted sessions on heat transfer and solidification phenomena; J. G. Kura, Battelle Memorial Institute, covered fluid flow, horizontal and vertical gating and AFS research developments. R. E. Betterley, T&RI Training Supervisor, conducted the achievement test.

T&RI Sponsors Advanced Course in Applying Cost Cutting to Foundries

■ Practical applications of cost reduction methods in foundries will be presented in an advanced *Industrial Engineering* course Dec. 8-12 at Milwaukee.

The course, co-sponsored by the AFS Training & Research Institute and Marquette University, will be held at the Marquette Management Center, Marquette University.

Industrial engineering experts, including authorities from foundries, will present the courses. Lectures, demonstrations and discussion periods will be used to cover the four subjects given during the five days.

The topics are Work Sampling; More Accurate Rating of Time Studies, Cutting the Errors in Half; Statistical Quality Control and Using Motion Pictures in the Foundry for Industrial Engineering.

Instructors from foundries are James Barrabee, International Harvester Co., Milwaukee and Lacey Randolph, American Steel Foundries, Granite City, Ill. Other teachers will be Prof. W. J. Richardson, Lehigh University, Bethlehem, Pa.; Dr. M. E. Mundel, time study authority, Milwaukee; Irving Schoeninger, Globe Union Co., Milwaukee; and Arnold Jakel, quality control consultant.

Marquette University **Management Center**, Milwaukee.

Students from United States and Canada Attend Five-Day Course on Gating and Risering of Ferrous Castings.

Warns Ferrous Foundrymen of Inroads by Light Metals . . . .

by C. F. ORLOFF
Chevrolet Engineering Div., GMC
Warren, Mich.

Editor's Note: *This article contains highlights excerpted from a talk by C. F. Orloff presented at the 1958 Michigan Regional Foundry Conference.*

■ The trend toward light metal die casting certainly is a challenge to sand casting ferrous foundries. To meet this competition sand casters will have to develop their skills toward improved dimensional control, lower cost and lighter castings.

However, this evolution from the exclusive use of heavy ferrous alloys to a more specialized division between heavy and light metals is just that—an evolution, not a revolution.

The automotive designer has no favorite in this race. We really have no preference as to whether a piece is forged, cast, stamped or extruded, as long as we get the part that will fulfill its function best at the lowest weight and cost.

The same thing generally holds true for choice of materials. All we want is a sound component that has the necessary physical properties, is dimensionally accurate within the required tolerance and can be produced without excessive cost.

In dealings with product design engineers it must be realized that our primary interest is not in the casting as such, but in the final product. Any saving you can achieve in the cost of casting is welcome. But if the cheaper casting means that more machining will be necessary, and that the total cost will therefore be greater, the apparent foundry saving becomes useless.

▪ One of our goals is a logical expansion of requirements we have been demanding a long time—thinner walls and castings that are not highly stressed by residual strains.

▪ Secondly we want to eliminate or greatly reduce parasitic slugs of iron that are not necessary to the operation of the part, but are required by foundry practice.

▪ Third, we want to get closer dimensional tolerances and smoother surfaces on our castings to decrease machining and cleaning expense.

▪ Fourth, we want to see draft minimized. This is another source of extra machining. In fact we would like to see draft eliminated altogether.

Foundrymen who have dealings with the automotive industry are familiar with the fact that there has been a definite movement toward the use of aluminum permanent mold and die castings in certain chassis components.

From almost no aluminum 30 years ago, the average American car has gone up to about 45 lb in 1958. With automatic transmission, power brakes and power steering, the average is over 50 lb of aluminum content. Some cars have more than 100 aluminum parts totaling 70-80 lb. The forecast is for 75 lb of aluminum per car by 1965. This is an indicated consumption of 600 million lb in an eight million car year, or three-quarters of the total United States aluminum production in 1949.

The Turboglide transmission is the most important example in Chevrolet of the movement toward light metals. In this transmission we save both weight and money by die casting the case. Many long oil passages that would be drilled in an iron casting are die cast to size in the transmission case. Elimination of the drilling and a reduction in machining time cut the cost of the aluminum case to the point where the iron case no longer was competitive.

You are no doubt aware of experiments that have been performed with aluminum cylinder blocks. New processes and designs to make them practical are under study. We know the use of aluminum blocks will save 75 lb per engine in weight, so the project is most attractive from an engineering point of view.

Further indications that we have progressed beyond the crystal ball gazing stage in the movement toward light metals was given by Chevrolet's decision to build an aluminum foundry near Massena, N. Y. Both permanent-mold and die-casting facilities are being set up at this location.

Reynolds Metals Co. also has begun construction of a reduction plant adjacent to our facility. By this arrangement molten aluminum will be delivered directly from the reduction plant to the foundry for immediate casting. These facilities will be operating early next year.

All of this talk of light metals and weight saving may make you begin to wonder whether we are trying to do away with iron and steel castings altogether. Far from it.

There are many applications where the superior damping, low thermal expansion and other characteristics of iron will continue to be needed.

Michigan Conference Papers . .

■ New developments in molding, melting, material, design and marketing and methods of putting them to practical use were discussed at the Michigan Regional Foundry Conference held Oct. 15-16 at the University of Michigan, Ann Arbor, Mich.

The conference was sponsored by the AFS Saginaw Valley, Western Michigan, Central Michigan and Detroit Chapters and the Student Chapters of the University of Michigan and Michigan State University.

W. C. Truckenmiller, Albion Malleable Iron Co., Albion, Mich., served as conference general chairman and D. I. Jacobson, Grand Haven Brass Foundry, Grand Haven, Mich., served as chairman of the program committee.

New Molding Techniques

First of the technical sessions was a five-man panel discussing new molding techniques for obtaining accurate dimensions in castings. In addition to an explanation of the techniques, each speaker analyzed three representative castings.

■ **C. A. Parlanti,** Niforge Engineered Castings, Inc., Boston, described the Parlanti mold process for the production of high quality castings. Process controls the rate of heat transfer and feeds the castings with sufficient liquid metal until the casting requires no more metal for its contraction.

The mold is aluminum with the inner face deeply anodized. The anodized layer has a melting point of over 3700 F and resists erosion from molten metal contact. The anodized film momentarily checks the flow of heat from the metal as it is poured, keeping it from freezing too rapidly. It also acts as a barrier enabling the mold to conduct the heat to inner faces of the mold at a regulated rate.

Because of the controlled rate of solidification and freezing, superior physical properties are claimed for aluminum castings in Parlanti molds.

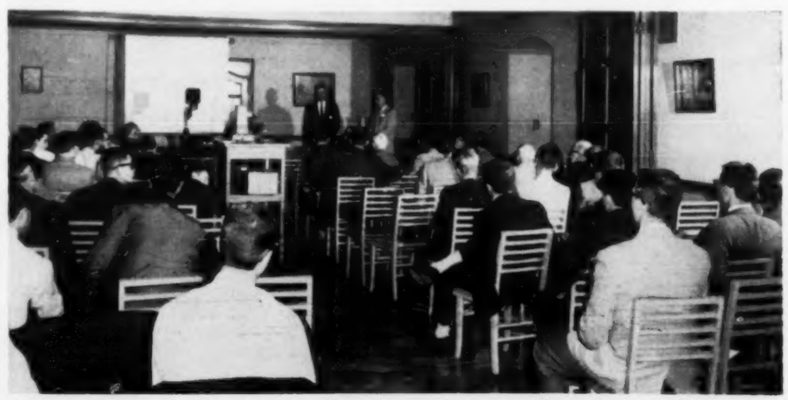
■ **Louis J. Pedicini,** Congress Die Casting Div., Tann Corp., Detroit, spoke on die casting as a cast-to-size process. He illustrated the capability of the die casting process with the approximate dimensional tolerances for the two most common die-casting alloys:

	Zinc	*Aluminum*
Min. variation from drawing, in./in.	0.001	0.0015
Min. draft on cores, in./in. of length	0.003	0.010
Min. draft on side-walls, in./in. of length	0.005	0.008
Min. parting line tolerance, inches	0.004	0.005

Main advantages of die casting process are:

▪ 1. Rapid and economical production in large quantities.
▪ 2. Close dimensional tolerances requiring little machining.
▪ 3. Extremely smooth surfaces.
▪ 4. Very thin sections.
▪ 5. Superior mechanical properties for a given alloy.

■ **C. W. Schwartz,** Misco Precision Casting Co., Whitehall, Mich., discussed *Investment Casting and Related Processes,* pointing out that most of the success of investment casting has been in making small parts with close dimensional tolerances. Recently developed ceramic shell molds have made larger size castings possible. A more complete summary appears on opposite page.



Fundamental approach to good casting design was outlined at **Michigan Regional Conference** by **James L. Raubinger,** Central Foundry Div., GMC, Saginaw, Mich. On right is Prof. **C. C. Sigerfoos,** Michigan State University, East Lansing, Mich., technical chairman.

Regional

. . . . . Stress Application . . . .

Other speakers and their subjects were: *Shell Molding*, **Joseph Orloff**, Central Foundry Div., GMC, Saginaw, Mich.; *CO_2 Process*, **Frank Illenda**, Diamond Alkali Research Center, Painesville, Ohio; *Sand Molding, Graphite Molding and Other Process and Summary*, **R. A. Flinn**, University of Michigan.

Operations of an automated foundry were presented by **A. H. Homberger**, International Automation Corp., Ann Arbor, Mich., with a film, *The Buhrer Automated Molding & Pouring Method*. The film depicts operations in the foundry of George Fischer Ltd., Switzerland. Burher system uses pneumatic-mechanical controls and a programmed cycling system which automatically performs molding of drag and cope molds, mold transfer, mold closing, weighting, pouring, cooling, shakeout and flask and sand handling.

An afternoon panel discussed gray iron, non-ferrous, steel and light metals melting.

■ **Howard H. Wilder**, Vanadium Corp. of America, Chicago, reviewed developments since 1950 in cupola design, operation, raw materials and processing of metal. He also outlined reasons for the increasing use of water-cooled cupolas and their advantages and disadvantages. He warned foundrymen to economize for survival and to adopt new techniques and control methods.

Other speakers were **H. M. Rowan**, Inductotherm Corp., Delanco, N. J.; **G. F. Kolle**, Ajax Engineering Co., Trenton, N. J.

Lovell Lawrence, Jr., Missile Div., Chrysler Corp., Detroit, was the banquet speaker on the subject of *The Evolution of Rocketry and its Importance on Space Flight*.

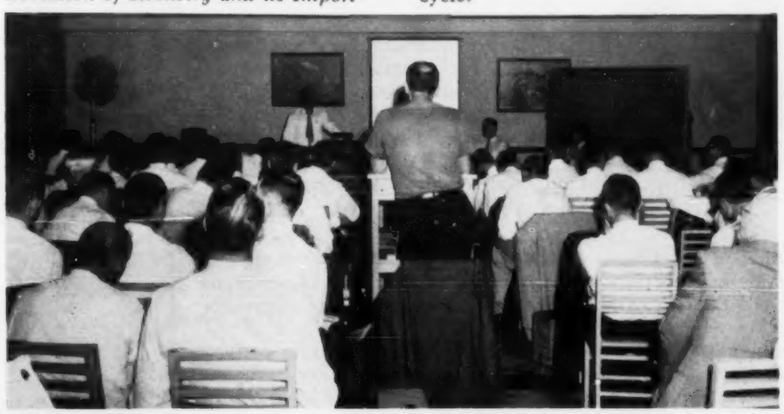
Thursday's technical sessions opened with **Conrad Orloff**, Chevrolet Engineering Div., Warren, Mich., warning foundrymen of the trend toward light-weight castings in the automotive industry. His remarks are summarized on the opposite page.

Synthetic Sands for Ferrous and Non-Ferrous Foundries were outlined by **Clyde Sanders**, American Colloid Co., Skokie, Ill. and **William Shartow**, Chevrolet-Saginaw Grey Iron Foundry Div., GMC, Saginaw, Mich. The speakers covered general scrap problems common to foundries with their causes and suggested cures. Shartow said to follow through with a satisfactory sand and make changes only when proven necessary. He stated that a good molding sand with proper control causes very little scrap.

■ **James L. Raubinger**, Central Foundry Div., GMC, Saginaw, Mich., spoke on *Fundamental Approach to Good Casting Design*, stressing the need for applying basic principles.

The concluding talk was given by Roger L. Leatherman, Phoenix Project, University of Michigan who discussed the new reactor at the University and peace-time applications of atomic energy.

■ **Paul Gouwens**, Armour Research Institute, Chicago, discussed *Progress in Electric Furnace Steel Melting* stating that the growth and importance of electric furnaces, as used in steel and alloy foundries has resulted in continuing improvements in arc and induction units. Greater trends exist toward mere mechanical ruggness, greater power input, higher voltages and faster speed of response for a more efficient melt-down duty cycle.



Addressing foundrymen at **Michigan Regional Foundry Conference** is **William Shartow**, Chevrolet Grey Iron Foundry Div., GMC, Saginaw, Mich. Shartow spoke on ***Synthetic Sands for Ferrous and Non-Ferrous Foundries***.

Advances in Investment Casting Broadens Field

by C. W. SCHWARTZ
Misco Precision Castings Co.
Whitehall, Mich.

Editor's Note: *This article contains highlights excerpted from a talk by C. W. Schwartz presented at the 1958 Michigan Regional Foundry Conference.*

■ Most of the success of the investment-casting process is due to its ability to cast small parts to close dimensional tolerances. Air-foil shapes such as turbine blades and vanes of all types have constituted about 75 per cent of the market for investment castings. Recent improvements have made larger castings possible.

Investment castings cannot compete directly with other fabrication processes. But if an alloy is required which is difficult to machine or forge, or if good surface finish with little or no machining is required, then the cost of investment castings can be competitive.

Misco has developed a ceramic shell process which differs from the conventional investment technique in that a ceramic shell approximately 1/4-in. thick is built up around the wax cluster instead of the large massive investment mold.

This process differs from the older process only on those steps following the assembly of wax pattern into cluster form. In the first step the operator immerses the cluster completely into the ceramic slurry, rotating it so that a uniform layer will be distributed over the entire wax surface. On removal it is drained evenly and stuccoed. The stucco material is spread over the entire coated cluster and serves as a mechanical bond between successive layers of ceramic coating. Dipping and coating is repeated until a 1/4-in. layer is accumulated.

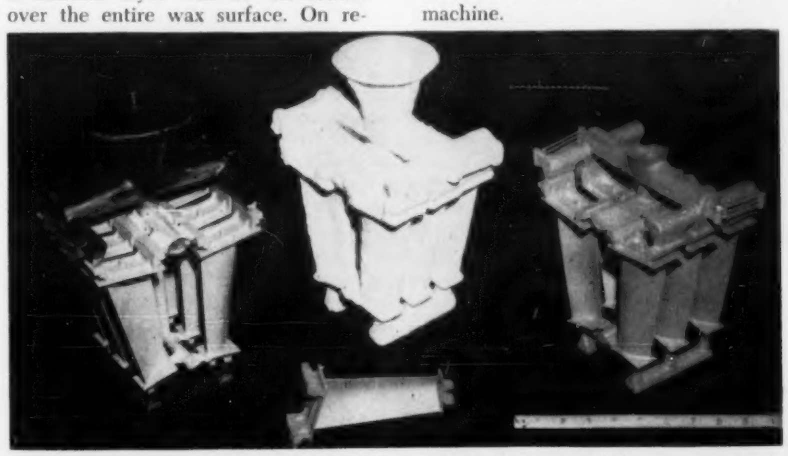
After drying, the dipped cluster is fired to 1900 F. Firing completely burns away all wax, leaving a strong ceramic shell with a cavity which is an exact replica of the original wax cluster.

The hot shell can be cooled back to room temperature and used immediately or stored indefinitely. It can be preheated to any temperature up to 1900 F. Ceramic shell molds can be clamped directly onto an electric arc, rollover type, melting furnace and poured by gravity or with air pressure forcing the metal into the cavity. It can also receive the metal from a gravity-pour shank ladle. None of these techniques require an insulating, strengthening backup material.

Following cooling, the casting is cleaned by conventional methods. Stresses set up on cooling cause most of the refractory shell to spall away. This makes the cleaning easier. Ceramic material sticking in hollow and undercut areas is effectively removed by sand blasting.

From this point castings follow the same cutting, finishing and inspection operations used on conventional investment castings.

The general rule of thumb tolerance range for investment castings is ±0.005 in. per in. There are many cases where closer dimensional tolerances are required, such as areas which are difficult or too costly to machine.



Basic steps in ceramic-shell process. On left is wax cluster for turbine-blade part. In center is ceramic shell after firing. Cast shell cluster is on right.

New England Foundrymen Hear the Latest

Over 360 foundrymen converged on the Kresge Auditorium at Massachusetts Institute of Technology, Cambridge, Mass., Oct. 17-18 for their 18th traditional homecoming – officially designated as the New England Regional Foundry Conference. The two-day event was co-chairmanned by the triumvirate on the right – Longin Shore, Reid Foundry, Amesbury, Mass.; Alexander Beck, Whitman Foundry, Inc., Whitman, Mass.; and Verle B. Utzinger, Walworth Co., South Boston, Mass. The broad scope and quality of the technical program is demonstrated in the summaries of talks that follow.

Alfred B. Steck, Metallurgical Associates, Inc., Boston, spoke on the subject, *Utilizing the Latest Development in Molding and Coremaking and Casting Processes for Increased Profits.* He touched briefly on most of the important recent metalcasting developments. Steck said . . . More effort is needed to convert more metal products to casting processes . . . Water-cooled cupolas are being operated acid in the morning for gray iron and basic in afternoon for ductile iron . . . Steel is being cast successfully in a shell mold containing limestone, which acts as an endothermic chill . . . Steel with 300,000 psi tensile strength is close to reality.

William B. Corcoran, Jr., Draper Corp., Hopedale, Mass. spoke about the *Production of High Quality Aluminum Sand Castings.* According to Corcoran, high quality can only be achieved if you adhere to the following 11 *musts*: 1) detail development of high quality to one person, 2) purchase restricted analyses ingot of a heat-treatable alloy, 3) maintain tight control over remelt scrap and magnesium additions, 4) degas completely, 5) prevent overheating, 6) melt and pour from same crucible, 7) pour close to mold basin, 8) use strainers and chills, 9) control sand moisture rigidly, 10) heat treat within close limits, and 11) DEVELOP A DESIRE FOR QUALITY IN ALL PERSONNEL.

Earl Jahn, Production Pattern & Foundry Co., Chicopee, Mass., addressed the New England Conference on *Application of Shell Cores–Interest to All.* Jahn elaborated on each of the following advantages attributable to shell cores: Shell cores are more accurate because they are made and cured in the same box . . . Gas is easily vented because cores are hollow . . . Shell cores weigh as much as 50 per cent less than conventional cores . . . High flowability of shell sand permits blowing intricate-dense smooth cores . . . Need for core driers is eliminated. Core plates are not needed . . . . . . Lower blowing pressure reduces core box wear and minimizes box venting . . . Core sand can be mixed weeks ahead of use.

M. Luther Buchanan, C. L. U., Boston, talked about *Estate Planning–What it Means to You.* Buchanan said, "It is more difficult to keep wealth than to attain it." He explained the many tax problems that eventually face every estate.

Joseph B. Stazinski, Elmira Foundries, General Electric Co., Elmira, N. Y., revealed how *Profit Dollars Slip Away* in the foundry. Some of the speaker's statements were . . . Before the purchase of new materials or equipment a thorough and nonpartisan analysis should be made . . . Such an analysis should answer: 1) is there a need? 2) will the purchase do what we expect? and 3) can we justify it? . . . When methods get out of control, get back to the old reliable way before looking for a new method . . . Unless the will and desire to make equipment work are combined with the equipment, profit dollars will not materialize . . . In order to have foundries grow and our jobs grow with them, we must make a profit.

Thomas Kiley, Meehanite Metal Corp., New York, discussed *Gating and Risering.* The five steps he recommended when planning gating are: 1) decide on pouring speed, 2) determine casting weight, 3) select sprues for correct pouring speed, 4) provide dirt traps and chokes, and 5) distribute in-gates to equalize temperature.

Anton Dorfmueller, Archer-Daniels-Midland Co., Cleveland, brought his audience up to date on *New Core Binders.* According to the speaker . . . The CO_2 Process is best for medium-sized, low-production cores used in non-ferrous (particularly aluminum and magnesium) as well as steel foundries . . . Shell cores are best suited for high and medium production where complex design or close tolerances are a problem . . . The Air Setting Process is a useful tool in production of large core work requiring considerable time for fabricating, baking and cleaning . . . New Air Setting binders are useful in facings for heavy castings molds because no baking is required.

Richard L. Olson, Dike-O-Seal, Inc., Chicago, explained *Pattern Construction and Rigging Improved Techniques in Core Blowing.* Olson announced several new developments in pattern and core box construction. One of these is the molding of a thin rubber strip on the flask bearing surface of a match plate. This cushion practically eliminates wear on mating surfaces of tight flasks and stops the noise generally associated with jolt-squeeze molding. He also told of a new hard coating for aluminum core boxes which should reduce wear and sticking problems.

New England Regional

AFS Director A. A. Hochrein, Vice-President C. E. Nelson, Director T. W. Curry and Director H. G. Stenberg on hand for the New England Regional Foundry Conference.

William Baer, Bureau of Ships, Navy Department, U. S. Government, Washington, D. C., explained *Foundry Practices for Naval Castings.* Baer commented . . . Responsibility for testing castings has been shifted from the government to the foundry . . . Government inspector will only examine your test records in the future . . . New alloy containing 11-13 percent Mn has been accepted as a substitute for Ni-Al bronze because it has better ice-water properties for ship propellers.

Thomas E. Barlow, International Minerals & Chemical Corp., Skokie, Ill., described *Modern Sand in the Mold.* "You may know the green sand properties in the sand lab but what does this mean in terms of what you have in the mold?" asked Barlow. "Until you can interpret the lab test so it tells you what you have in the foundry, then you don't have sand control. And the more materials you add to sand for controlling properties, the more opportunities there are for mistakes."

E. Frank Tibbets, Wollaston Brass & Aluminum Foundry, Wollaston, Mass., talked to the foundrymen about *Repair and Salvage of Non-Ferrous Castings.* According to Tibbetts . . . Government specifications are not sympathetic toward repairing castings so special permission is often required . . . Peening and impregnation are good for salvaging leaky castings . . . Flow-welding or burning is one of best ways to repair major defects . . . Always do a good job of excavating defect but avoid narrow, deep grooves.

OTHER HIGHLIGHTS OF THE CONFERENCE

. . . National AFS dignitaries on hand were Vice-President Charles E. Nelson and Directors H. G. Stenberg, A. A. Hochrein, and T. W. Curry . . . Alexander Beck was presented a Certificate of Appreciation . . . Coffee and doughnuts were served every morning at the Kresge Auditorium before technical sessions started . . . Prof. Howard F. Taylor excelled as master of ceremonies for the Conference Dinner in his inimitable manner . . . Tom Dowd, traveling secretary of Boston Red Sox, gave an entertaining talk at the same dinner . . . 320 foundrymen attended the smoker and dinner sponsored by the VENDORS, who provided 70 valuable door prizes . . . Pictures were taken by Tom Saunders, Debevoise-Anderson Co.

7th All Canadian Regional

THREE REVOLUTIONARY TRENDS IN METALCASTING INDUSTRY SPOTTED AT CANADIAN CONFERENCE

Revolution!

Two hundred and forty Canadian foundrymen attending the 7th All Canadian Conference of AFS were advised of three revolutionary trends in metalcastings and in scientific discovery and application.

The revolutionary trends are:

- Accelerating use of light metal castings by the automotive industry;
- A revolution in scientific discovery;
- Molding machines that produce sand molds with shell-quality surface finish.

This conference which was held at the Royal Connaught Hotel, Hamilton, Ont., October 16 and 17, was planned by a committee headed by general chairman A. Reyburn, John Bertram & Sons Ltd., Dundas, Ont. Other conference officials included vice-chairman F. Rutherford, Refractories Engineering and Supplies Ltd., Hamilton; secretary J. W. Wallace, Canadian Westinghouse Co., Hamilton; treasurer S. E. Robinson, John Bertram & Sons Ltd., Dundas, Ont.; and F. Kellam and M. D. Bleaken, Electro Metallurgical Co., Toronto, who arranged the technical program.

Summaries of technical papers:

■ The replacement of many automotive gray iron castings with aluminum castings is "as inevitable as the tide" according to the paper "Light Metals Versus Ferrous Metals" presented by Harry Gravlin, Chrysler Corp., Detroit. Gravlin noted that weight was once a major concern in determining the ride and roadability of an automobile, but that modern suspension systems produce desirable characteristics without depending on excessive weight while the need for economy of operation requires drastic reductions in total vehicle weights.

A 200-lb lighter engine block will permit a 100-lb weight reduction in the frame of the automobile, and this will permit use of lighter brake drums, which allows a string of further weight reductions, according to Gravlin.

Gravlin stated that the way for ferrous foundrymen to react to this changing picture is to get engineering on castings into areas where castings are not widely applied and to improve the cast product so as to retain the greatest share of present business.

■ J. F. Orloff, Central Foundry Div., General Motors Corp., Saginaw, Mich., expressed in his paper "Pouring and Gating of Green Sand and Shell Castings" the opinion that newly introduced diaphragm-molding equipment can challenge shell molding. He stated that the greatest sales gains made by his organization have been made in the sale of castings poured in shells, but that the new diaphragm equipment could change the picture since it produces a sand mold that results in surface finish equal to shell molded castings.

The Orlox paper also described a program of instituting standard procedures and engineered gating systems that has reduced the scrap rate in his plant from 15 per cent to 5 per cent. He stated that one per cent scrap costs $75,000 at his plant which produces 1500 tons per day.

The technical program was augmented by tours through the following plants: Canadian Westinghouse Ltd.; International Harvester Co. of Canada Ltd.; Dominion Foundries & Steel Ltd.; McCoy Foundry Co. Ltd.; and Galt Brass Co.

■ Today we are laying bare the secrets of the universe through scientific discovery and its application. This was described as the third revolution by S. H. Deeks, Industrial Foundation on Education, Toronto, in his paper "The Third Revolution."

The first two revolutions were described as use of the wheel and beasts of burden and the industrial upheaval in Europe.

The future belongs to nations capable of anticipating the impact this revolution will have on established conventions, Deeks stated.

The course of the future must be determined against a background of knowledge and understanding of certain characteristics in our environment and the conflicts with which the free world is faced today.

Deeks noted these characteristics:

We are living in a rapidly changing world and the forces that are at work assure us that this rate of change will continue to accelerate. Forces at work are largely involved in the military, political, economical and ideological areas. The free world must compete successfully in all of these if it is to survive.

"Successful competition in the military area is the price we must pay to purchase additional time to find the fundamental long-term solution to our problems.

"Decisions must be made and actions taken in economics and world markets or all that we may be able to accomplish in the military will come to nought.

"Basically the ideological struggle is for the minds and spirits of men. It is a struggle to convince humanity with the aid of military and economic might that one ideology is superior to another. It is basically a conflict of free enterprises versus a state-directed and state-controlled economy."

■ The "third revolution" which Deeks describes is the result of the activities of such organizations as the Physical Metallurgy Division of the Canadian Department of Mines and Technical Surveys.

Operations of the division were explained by S. L. Gertsman, chief of the division, in his paper, "Science at the Service of the Canadian Foundry Industry." The division operates facilities for development, fabrication and testing of ferrous and non-ferrous alloys. It also furnishes a consulting service to government agencies and Canadian industry. In addition to the scientific apparatus normally associated with modern research laboratories, it has excellent facilities for applied research on an industrial or a semi-industrial scale.

Gertsman related that typical of the division's cooperation with Canadian industry is the research on metal penetration of cores. Foundries had been asked to list the process problems causing the greatest concern to the industry.

Investigation started with a literature research followed by tests at the Mines Branch laboratories resulting in a casting designed to study the factors governing penetration. The casting has been adopted as a tentative AFS standard. From this research definite conclusions were made on the metal penetration in cores.

■ Improvements in casting techniques and materials coupled with requirements for closer tolerances and stricter specifications must be accompanied by better control methods, W. K. Bock, National Malleable & Steel Castings Co., Cleveland, told foundrymen in his paper "Is Quality Control Old Stuff in the Foundry?"

In any foundry, he said, a definite practice is followed and changes in practice are made deliberately only after careful consideration and experimentation. The standard production procedure yields castings of a given quality and with comparatively small variations in quality. Any change that is made must not cause a deterioration in quality or a wider variation.

Unfortunately, human errors, equipment failures or raw materials can introduce changes in the process which produce results of poor quality or greater variation.

Bock noted that the quality control charts are calculated from past performance of the process with limits set mathematically from previous results. There is little danger of the chart indicating danger when none has occurred. This basing of a decision objectively and the subsequent possibility of eliminating needless trouble shooting is one of the strongest selling points for statistical quality control.

■ A definite relationship exists between most physical properties of molding sands with one or more other properties, A. Johnson, American-Standard Products (Canada) Ltd., Toronto, Ont., told Canadian foundrymen in his paper "Molding Sand Control."

If one physical property of the sand is out of control, the sand may still be in control because of a balancing effect of another property. All physical tests should be correlated with each other before any change is made to the molding sand mixture.

Control of moisture in molding sand is the key to good castings. The tightest possible maximum and minimum limits for the percentage of moisture in the sand must be set. Fractions of a per cent can mean the difference between a good casting and a bad one. Varying moisture content can account for changes in the casting finish, flowability, green strength and permeability.

Control of clay content in molding sand is second only to moisture control. An increase in the clay content will increase the mold hardness and green compression strength and decrease the permeability and flowability. The clay content should be kept high enough so that the molding sand will not produce any sand defects.

The flowability test is an important control to determine if the sand is tempered to the correct moisture content. The reading can also be a guide to proper tempering. If the moisture content has increased, it is a good practice to see if there is any change in the flowability reading before making any change in the sand.

Informal meeting of dignitaries at **All-Canadian Conference** include AFS President **L. H. Durdin,** Ontario Chapter Chairman **John M. Hughes,** Conference Chairman **A. Reyburn** and Hamilton **Mayor Jackson.**

Plant visits were made in Hamilton area to ferrous and non-ferrous foundries. Six plants were open to foundrymen attending **All-Canadian Conference.**

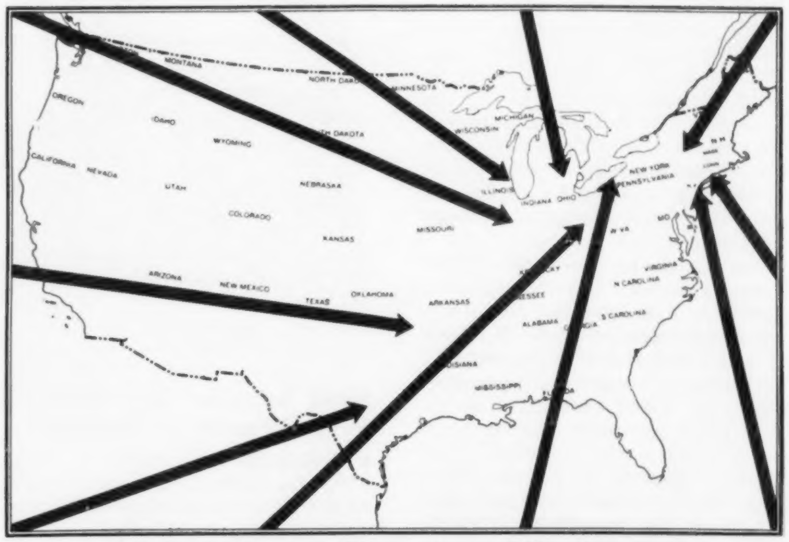
A. J. Paul, Central Illinois

L. J. Woehlke, Wisconsin

A. R. Karpicke, Saginaw Valley

R. N. Williams, Eastern New York

E. F. Hines, Tri-State



Meet Your Chapter Chairman

M. H. Gould, Connecticut

K. E. Kielty, San Antonio

D. M. Marsh, Central Ohio

W. S. Hodge, N. W. Pennsylvania

W. T. Bourke, Metropolitan

Sand Division Reviews Papers

■ Written and oral reports from American and European authors were reviewed at the September meeting of the Sand Division Basic Concepts Committee.

These reports included:

▪ *Grain Size—Its Influence on Some Physical Properties*, given by D. C. Rose, Wedron Silica Co., Chicago. The report includes two types of distribution for each of the rounded and subangular types. There are two sieve analyses for the commercial sands. Further discussion on the report at the next meeting.

▪ *Blends of Screen Fractions*, was given by T. W. Seaton, America Silica Sand Co., Ottawa, Ill., followed by a written discussion by W. K. Bock, National Malleable & Steel Castings Co., Cleveland, entitled *Effect of Sand Distribution on Density*.

▪ V. M. Rowell, Harry W. Dietert Co., Detroit, presented data from Franz Hofmann, George Fischer Ltd., Schaffhausen, Switzerland, a corresponding member, with supplementary surface area measurements and photomicrographs of American sands. The Hofmann paper on measurement of surface area was recommended to the Program & Papers Committee.

The Committee accepted the measurement of angularity as being:

$$\text{Coefficient of Angularity (E)} = \frac{\text{Measured Surface Area}}{\text{Surface Area of Equivalent-Sized Spheres}}$$

This coefficient is accepted with reservation, due to the known effect of surface irregularities such as pits on surface area.

▪ An oral review of methods of determining packed density was made by R. W. Heine, University of Wisconsin, Madison, Wis. Summary charts were presented giving a method for predicting density as measured by either the dry-loose density or wet density according to methods developed by Heine.

This method is essentially a chart based on data collected by the originator and constructed with parameters of mean particle diameter, distribution according to number of sieves present and packed density.

■ The Committee voted that the values for surface area of spheres, as presented by the late J. M. Dallavalle, be accepted as standard.

Apprentices Benefit from Competition Whether or Not They are Prize Winners

■ What are the benefits of competitive training obtained from entering the annual AFS Kennedy Memorial Apprentice Contest?

Twenty years ago, A. R. Luebke, supervisor of apprentices, Fairbanks, Morse Co., Beloit, Wis., stated in an article appearing in The American Foundryman (now Modern Castings):

"Contests of this type can be considered an examination on the progress made, and assimilation of knowledge on the fine points of foundry practice. We can assume that a certain young man has made rapid progress because he does good work and learns rapidly.

"An examination conducted whereby he cannot secure assistance or advice will bring out items on which he lacks thorough understanding."

Luebke was confident that one or more of his apprentices would win in the national competition.

Although none of his apprentices won, they greatly benefited through a review of their work.

Initially, the finer points of molding were explained. The discussions proved so interesting that two, four-hour classes were held with all foundry and patternmaking apprentices.

One class covered foundry practices and costs. Actual castings made by the apprentices were used to point out how better practices would have improved their work. Foundry costs were also explained, in particular scrap costs due to defective castings and losses due to shrinkage.

The second class was conducted by the plant metallurgist who explained the analyses and properties of iron, proper mixtures, charging and other cupola practices.

Concluded Luebke: "The results obtained from this contest have given them a better understanding and education on foundry practice."

The 1958-59 contest is well underway in all five divisions; wood patternmaking, metal patternmaking, steel molding, iron molding and non-ferrous molding.

Since the 1959 Convention will be held in April, all chapters are urged to close local elimination contests by March 1, 1959, so that national entries are received by 5:00 pm, March 1, 1959. Send entries to Prof. R. W. Schroeder, University of Illinois, Navy Pier, Chicago. Do not ship entries to the National Office in Des Plaines, Ill.

AFS Publishes New Noise Control Manual

■ A study of foundry noise control problems and recommendations are contained in the new 50-p AFS Foundry Noise Manual recently published.

The case-bound book, prepared by the Noise Control Committee of the AFS Safety, Hygiene and Air Pollution Program, will aid foundrymen in carrying out an effective noise control program and enable them to avoid pitfalls in control procedures.

Chapters in the book consist of:

▪ Compensation Aspects of Loss of Hearing.
▪ Physics of Noise.
▪ Physiological Aspects of Hearing and Hearing Loss.
▪ Medical Supervision of Workers Exposed to Noise.
▪ The Measurement of Noise.
▪ Foundry Exposures to Noise.
▪ Engineering Control of Noise.
▪ Personal Protective Equipment.

The manual is available to members for $3; non-members, $4.75.

Sand Division Committees Make Reports on Progress

■ Four suggestions dealing primarily with committee reports were made by the Sand Division Executive Committee meeting in September.

These recommendations were:

▪ AFS prepare a separate publication of committee reports as a bound volume for use of foundrymen in the field.
▪ Committee reports be published in Transactions.
▪ Committee reports be submitted to the Program & Papers Committee.
▪ The Moisture Test Standard be rewritten and presented for vote at the next meeting.

Various committee reports were also presented. Included were:

Grading, Fineness & Distribution—AFS clay determination test under study; subcommittee on sampling has a report; subcommittee on Sand Handbook revision ready to submit report on suggestions.

Basic Concepts—Work in progress includes density and base permeability measurements on controlled distributions made by blending screen fractions; densities of two-peak and very broad distributions; densities of angular and rounded sand grains; permeability tests on various base mixtures.

West Coast Committee—Being reorganized.

Canadian Committee — Preparing draft on Canadian sand practice. Needs additional data on rebonding of sand and frequency of testing. Next project will be listing of all Canadian sands used in foundries.

The Division Nominating Committee: Chairman L. J. Pedicini, T. E. Barlow, V. M. Rowell and Nicholas Sheptak. The nominating committee will report at the next meeting of the Executive Committee.

T. E. Barlow, Eastern Clay Products Dept., International Minerals & Chemical Co., Chicago, was appointed as the Division's representative to coordinate technical and exhibit program at the 1959 Convention.

Runner Temperature Drop Studied by Heat Committee

■ A plan to investigate the temperature drop in aluminum and steel runners using the analogue computer, presented in physical units and checked against actual field tests has been approved by the Heat Transfer Committee. The plan is designed to make results of the investigations more readable to foundrymen.

Actual field trials will be limited to aluminum runners because of certain difficulties involved with steel. Field tests are to be merely check runs.

Conditions of the field tests:

▪ Mass rate of flow (lb per sec) through the runner to be determined.
▪ Tests to be made on 3/4, 1 and 1-1/2 in. diameter runners.
▪ Tube (runner) length to be 30 in.
▪ Pouring temperatures to be 1300 and 1450F.
▪ Metallostatic head will be held constant by suitable pouring basin.

In order to determine temperature gradient, two thermocouples will be used in the runner. A third thermocouple will be set near the pouring basin where the temperature is constant to establish a reference temperature.

W. H. Buell Replaces Mills

■ W. H. Buell, Aristo Corp., Detroit, has been named Vice-Chairman, Core Test Committee, Sand Division, replacing D. S. Mills, Process Development Section, GMC, Detroit.

Western Michigan Chapter members conducted their annual Management Night in October with Carl Taylor, Waukesha State Bank, Waukesha, Wis., speaking on ***Political Business.*** Shown in photo are **David I. Jacobson,** Grand Haven Brass Foundry, Grand Haven, Mich., Chapter Chairman 1957-58; Chapter Chairman **J. Joseph Cannon,** Enterprise Brass Works, Muskegon, Mich.; speaker **Taylor;** Chapter Vice-Chairman **E. J. Carmody.** Engineering Foundry, Inc., Cedar Springs, Mich.; and Chapter Treasurer **Walter Blackmer,** Muskegon Piston Ring Co., Sparta, Mich.—***Dan Connell***

Participating in **Saginaw Valley's** October meeting were Membership Chairman **George C. Schebler,** Chevrolet Grey Iron Foundry, GMC, Saginaw, Mich.; Technical Chairman **Paul W. Olson,** Eaton Mfg. Co., Vassar, Mich.; speaker **W. G. Gude;** Chapter Chairman **Arthur H. Karpicke** Central Foundry Div., GMC, Saginaw, Mich.; **Ormond Requadt,** Dow Chemical Co., Bay City, Mich.; and **George R. Frye,** Eaton Mfg. Co., Vassar, Mich.—***John R. Fraker***

Washington Sponsors Metallurgy Program

■ Fifty foundrymen in the Seattle area attended a five-week course on Foundry Metallurgy sponsored by the educational committee of the Washington Chapter.

The courses were presented during April and May at the University of Washington with William A. Snyder, associate professor, University of Washington, acting as instructor.

Included in the study were "Metals and Alloys," "Solidification of Metals," "Physical Properties," "Heat Treatment," and "Metals and Alloying Practices."

This was the first course arranged by the chapter's permanent educational program.

Western New York Chapter

Legislation and Industry

■ Management itself must share much of the blame on legislation affecting foundries, Walter J. Mahoney, New York State Senator, told members of the Western New York Chapter at its October meeting. The Senator recommended that management of New York industry take a more active part in matters dealing with legislation.—*Donald G. Krueder*

Cincinnati Chapter

Hears Nodular Iron Talk

■ An illustrated lecture on the production of nodular iron was presented at the September meeting by Harvey E. Henderson, Lynchburg Foundry Co., Lynchburg, Va.

Henderson told of Lynchburg's production of nodular iron which started in 1949 and how new techniques were adopted to improve the metal and reduce costs.—*R. R. Deas, Jr.*

St. Louis Chapter

Hears Talk on Casting Design

■ Management Night drew approximately 120 members to hear R. L. Gilmore, Superior Steel & Malleable Castings Co., Benton Harbor, Mich., discuss fundamentals of casting design.—*R. E. Hard*

Chapter News

Reach Halfway Point in Drive for AFS Membership

■ December marks the halfway point in AFS 1958-59 activities. Six months remain for chapter membership chairmen to reach their targets.

Winter and spring months are generally regarded as more favorable than summer and fall months for membership activities. Sufficient time remains for all chapters to achieve their membership goals.

The total Society membership target for 1958-59 is 13,700 with chapters assigned 12,589 and the remaining 1111 set as the goal for student chapters, foreign and non-chapter members.

Ten chapters started the current year having made their 1957-58 quotas. These were New England, Philadelphia, Piedmont, Ontario, Pittsburgh, Central Ohio, Central Indiana, Northern Illinois & Southern Wisconsin, Twin City and Washington.

Following are the membership standings on June 9, 1958 and the 1958-59 targets.

REGION # 1	*6-9-58*	*Target.*
Chesapeake	150	159
Connecticut	117	130
Metropolitan	443	463
New England	255	270
Philadelphia	425	440
Piedmont	143	158
Total	1,533	1,620
REGION # 2		
Central New York	170	185
Eastern Canada	334	357
Eastern New York	101	111
N. Western Pennsylvania	172	187
Ontario	447	459
Pittsburgh	354	374
Rochester	80	87
Western New York	208	231
Total	1,866	1,991
REGION # 3		
Canton	161	168
Central Ohio	207	214
Northeastern Ohio	790	825
Toledo	188	200
Total	1,346	1,407
REGION # 4		
Central Indiana	359	369
Central Michigan	213	225
Cincinnati	308	323
Detroit	530	555
Michiana	271	283
Saginaw Valley	382	398
Western Michigan	240	252
Total	2,303	2,405
REGION # 5		
Central Illinois	210	230
Chicago	777	837
No. Ill.—So. Wis.	130	138
Quad City	205	216
Twin City	224	232
Wisconsin	639	656
Total	2,185	2,309
REGION # 6		
Birmingham	450	480
Corn Belt	53	58
Mexico	77	86
Mid-South	40	55
Mo.—Kan.	75	84
St. Louis	263	280
Tennessee	221	236
Texas	241	266
Timberline	64	71
Tri-State	113	121
Total	1,597	1,737
REGION # 7		
British Columbia	97	104
Northern California	294	306
Oregon	128	140
Southern California	379	396
Utah	79	91
Washington	78	83
Total	1,055	1,120
TOTAL, CHAPTERS	11,885	12,589
TOTAL Student-Foreign Non-Chapt.	932	1,111
GRAND TOTAL	12,817	13,700

Central New York Hears Talk on Testing Castings

Central New York Chapter members attend September meeting featuring talk on non-destructive testing.—*C. W. Diehl*

Central New York Membership Chairman **Charles Meister,** Jardine Bronze Foundry, Inc., Baldwinsville, N.Y. (left) and Chapter Chairman **Ralph J. Denton,** Denton Refractory Service Corp., Syracuse, N.Y. (right) pose with new members: **William Fleischer, Jr.,** Ingersoll-Rand Co., Syracuse, N.Y.; **Monroe Cromp,** Oberdorfer Foundries, Inc., Syracuse, N.Y. and **Jack Lawler,** New York Airbrake Co., Watertown, N.Y.

Cincinnati Chapter

Cleaning and Finishing Talk

■ Methods for cutting costs on cleaning and finishing operations were explained at the October meeting by Edward F. Price, Dayton Malleable Iron Co., Dayton, Ohio.

Finishing room problems may be minimized by good quality control measures, efficient inspection and realization of customer's actual requirements, Price told the members. He demonstrated his talk with actual castings and showed slides of production runs incorporating quality control.—*J. D. Claffey*

Northeastern Ohio Chapter

Opens Apprentice Contest

■ Prizes of $25, $15 and $10 will be awarded to first, second and third place winners in the Northeastern Ohio Chapter's local apprentice contest. Competition will be held in all five divisions in the AFS Robert E. Kennedy Memorial Apprentice Contest.

The first three winners in each of the five divisions will be entered in the national competition.

Members of the Chapter's Apprentice Contest are Donald C. Hartman, Cove Pattern Works, Inc., Cleveland; Frank C. Cech, Max S. Hayes Trade School, Cleveland; W. O. Larson, Jr., W. O. Larson Foundry Co., Grafton, Ohio; Wm. E. Mahoney, Cleveland; George Luekens, Hickman, Williams & Co., Cleveland.

Northeastern Ohio members at the October meeting heard Robert J. Ely, American Brake Shoe Co., discuss ***High Strength Aluminum and Steel Castings.*** Shown in photo are speaker **Ely** and **John F. Wallace,** Case Institute of Technology, Cleveland, technical chairman.—***Harold Wheeler***

Utah Chapter

Hears Casting Design Talk

■ *Steel Casting Design* was presented at the opening meeting by Robert J. Franck, Superior Steel & Malleable Castings Co., Benton Harbor, Mich. Franck, in an illustrated lecture, talked about the use of stress analysis, brittle lacquer and strain gages.

Chapter Chairman Claude Cardall, Pacific States Cast Iron Pipe Co., presided. Donald M. Rosenblatt, American Foundry & Machine Co., served as technical chairman. Certificates of appreciation were awarded to Arthur S. Klopf, Jack May, Everett Backman, and Edwin Rowe, for service to the chapter during its first year of organization.

Rochester Chapter

Cutting Blast Cleaning Costs

■ A discussion of reducing blast cleaning costs was outlined to Rochester Chapter members at the October meeting by George O. Pfaff, Wheelabrator Corp., Mishawaka, Ind.

Efficient operations involve the correct amount and mixtures of abrasive and placement in the proper area. Any maladjustment of the equipment which affects any of the basic factors will reduce efficiency and increase costs.

Loss of efficiency at any of these points is cumulative. Pfaff illustrated this with a machine throwing 75 per cent of the full abrasive load, with abrasive containing 25 per cent useless fines and contaminants, and only 75 per cent of the abrasive striking the work. This machine is operating at only 42 per cent efficiency.—*Thomas B. DeStefani*

Canton District Chapter

Publishes Monthly Bulletin

■ Canton District Chapter publishes a monthly 4-p bulletin on chapter activities. Included are: short biography on the technical speaker; biographical information on an officer or director; program schedule for year; a series of short reports on chapter activities; a listing of chapter officers, directors and committees and past presidents.

New Company Members

Tri-State Sand Co., Birmingham, Ala. (Birmingham Chapter).

Faunt Foundry Co., Chicago. (Chicago Chapter).

Reichhold Chemicals (Canada) Ltd., Toronto, Ont. (Ontario Chapter).

Wabash Smelting, Inc., Wabash, Ind. (Michiana Chapter).

Three **Western New York** members hold informal meeting; **Ted Booth,** Frontier Bronze Corp.; **Lyn Roberts,** Combined Supply & Equipment Co.; Chapter Chairman **L. B. Polen.**

Western New York Chapter Chairman **L. B. Polen** congratulates New York State Senator **Walter J. Mahoney** who spoke on "State Legislation Affecting Industry."

Western New York Officers for 1958-59 season. Vice-Chairman **A. J. Heysel,** E. J. Woodison Co., Buffalo, N.Y.; Chairman **L. B. Polen,** Allegheny Ludlum Steel Corp., Buffalo, N.Y.; Secretary **Ronald E. Turner,** Queen City Sand & Supply Co., Buffalo, N.Y.—*D. G. Krueder*

Central New York Chapter

Prepares Chapter History

■ A complete detailed history of the Central New York Chapter, formed in 1939, has been prepared by C.M. Fletcher, Fairbanks & Co., Binghampton, N.Y. Fletcher was Chapter Chairman, 1948-49.

Included in the Chapter history is a discussion of the organizational meeting and complete yearly records of officers, directors and technical programs including speakers, subjects and meeting places.

Dr. Joseph W. Spretnak, Ohio State University, addressing the **Central Ohio** Chapter in October.

Tennessee Chapter Holds Annual Picnic

Tennessee Chapter held its annual picnic at Lake Chicamaugua. Chow line shows portion of 200 members and guests attending. Membership has increased 25 per cent over last year due in part to concentration on renewals of former members.—*John D. Odom*

Drawing for prizes at Tennessee picnic, left to right are **Jack Austin,** U.S. Pipe & Foundry Co.; **Charles Seman,** Crane Co.; **John Odom,** Mueller Co., all of Chattanooga, Tenn.

Central Ohio Chapter

Keeping Designer Informed

■ Designers must be better informed on the properties and advantages of cast metals, Dr. Joseph W. Spretnak, Ohio State University, Columbus, Ohio, told members at the October meeting.

Spretnak presented an illustrated lecture on the comparative merits of castings and other forms of fabrication pointing out misconceptions concerning castings. Supplying of basic information on the properties of cast-metals to designers was recommended as a means of increasing the use of castings.—*Joseph A. Riley*

Buffet-style dinner meets with success at October meeting of **Wisconsin Chapter.**

Winner of television set is **Harvey Brisedine,** Combustion Engineering, Inc. Others are **Haskell Thomas, William Towns, Charles Seman,** all of Crane Co.

Eastern Canada members in October heard **E. E. Woodliff,** Foundry Sand Service Engineering Co., Detroit, discuss "Evaluation of Sand Additives and Properties." Shown in photo are Chapter Chairman **Max Reading,** Foundry Services (Canada) Ltd.; speaker **Woodliff; Leon Petit,** Montreal Bronze Ltd., winner of the door prize.—*R. B. Hill*

Tri-State Chapter

Controlling Foundry Costs

■ Techniques for controlling foundry costs were outlined at the October meeting by Gerard J. Brennan, Lester B. Knight & Associates, Chicago.

Topics covered included history and evolution of costing techniques, description of modern costing methods and reports, control reports and their use, oral and graphic presentation of costs and standard cost plus flexible budgets.—*Leslie O'Brien*

Central Michigan

Improving Employee Morale

■ Management knows far more about materials, processes, equipment and facilities with which it works than it does about the employee, Dewey F. Barich, president, Detroit Institute of Technology, told its September meeting.

A favorable attitude of top management itself toward the people who comprise the organization is basic, he stated. The nature of this attitude largely determines the structure of the organization and the quality of relationships that prevail within the structure.

Other observations made by Barich were:

▪ The same policies, attitudes and practices which are best calculated to produce good operating results over the long run are precisely those needed to produce high levels of employee morale.

▪ One of the great advantages of the simple and relatively informal organization is that such a structure not only permits but enforces a maximum of informal, face-to-face relationships and keeps impersonal institutionalized relationships to a minimum.

▪ Through an employee attitude inventory it is possible to compare morale in a given plant against morale in other plants. This survey will pinpoint the causes of high and low morale in individual plants.—*F. H. Hutchins.*

Schedule Texas Regional

■ A Texas Regional Conference will be held March 19-20 at the Menger Hotel, San Antonio, Texas. The conference will be sponsored by the Texas Chapter, the East Texas Section and the San Antonio Section.

Wisconsin members at the October meeting heard **L. L. Shafer,** Central Foundry Division, GMC, speak on the designing of castings for marketing.—*Bob De Broux*

Central Indiana Chapter members at the October meeting heard **William Illuminati** (seated) American Automation Corp., Detroit, discuss ***New Developments in the Foundry*** and present a film, ***Automated Foundry in Switzerland.*** **Carl Schopp,** Link-Belt Co., Indianapolis (right) was the technical chairman.—*William R. Patrick*

Ready to start drawing for door prizes at **Central Indiana Chapter** picnic are **Ralph Thompson,** Electric Steel Castings Co., Indianapolis; Chapter Chairman **William H. Faust,** Electric Steel Castings Co., Indianapolis and **John Kemp,** Hickman, Williams & Co., Indianapolis.

San Antonio Section

Discusses Foundry Problems

■ Foundry problems were discussed at the October meeting held at K. O. Steel Castings, Inc. Two problems involved the causes and cures of cracks in castings. Thirty-five members and guests attended.

What European foundrymen are doing was explained to the **Twin City Chapter** meeting by Clyde A. Sanders, American Colloid Co., Skokie, Ill. Shown in photo are Chapter Vice-Chairman **Carter DeLaittre,** Minneapolis Electric Steel Castings Co., Minneapolis; speaker **Sanders;** and Chapter Chairman **Robert J. Mulligan,** Archer-Daniels-Midland Co., Minneapolis.—*J. David Johnson*

Blast cleaning costs can be reduced through a definite program, G. O. Pfaff, Wheelabrator Corp., Mishawaka, Ind., told the **Canton Chapter** in October. Left to right in photo are: Chapter Treasurer **Dale Crumley**, Rockwell Mfg. Co., Barberton, Ohio; Chapter Chairman **Robert Mittelstead**, Lectromelt Casting Div., Akron Standard Mold Co., Barberton, Ohio; speaker **G. O. Pfaff**; Chapter Secretary **R. J. Gairing**, Wadsworth Foundry Co., Wadsworth, Ohio; Chapter 1st Vice-Chairman **R. J. Bossong**, American Steel Foundries, Alliance, Ohio.—*Wendell Snodgrass*

Saginaw Valley Chapter

Future of the Foundry Industry

■ New concepts of selling must be adopted by the foundry industry to keep pace with competitive means of fabrication, W. G. Gude, Penton Publishing Co., Cleveland, told Saginaw Valley foundrymen at the October meeting.

"Tomorrow the progressive foundry will be selling not merely a casting, or so much metal, but an engineered part—a part which the foundry's skill permits it to design and produce so that the casting will perform its intended function with the greatest efficiency at the lowest possible cost.

"This increasingly useful role of the foundry—if broadened and intensified—cannot help but add emphasis to the fact that a casting not only is the shortest distance between the raw material and a finished product, it also can become the best product for more application than we've ever known before."—*John R. Fraker*

Northern California Chapter

Hears Talk on Refractories

■ Four refractory engineers from the Bay area spoke at the October meeting, discussing basic refractories, super refractories, fire brick and refractory specialties.

Speakers were: Burt P. Christensen, Gladding McBean & Co.; William B. Franck, Carborundum Co.; Robert Goodell, E. J. Bartells Co.; Murray Schmidt, Kaiser Chemicals Div., Kaiser Aluminum & Chemicals Sales.

Chapter Chairman Gordon Martin, Atlas Foundry & Mfg. Co., Richmond, Calif., presided with Vice-Chairman Don C. Caudron, Pacific Brass Foundry Co., San Francisco, acting as technical chairman—*E. J. Ritelli*

Speakers at the **Northern California** October meeting were **Robert Goodell**, E. J. Bartells Co.; **William B. Franck**, Carborundum Co.; **Murray Schmidt**, Kaiser Chemicals Div., Kaiser Aluminum & Chemical Sales; **Burt P. Christensen**, Gladding McBean & Co.

Relaxing after **Northern California** meeting are **Arthur Brown**, **Robert Koontz** and **Robert Montgomery**, U.S. Pipe & Foundry Co., Decoto, Calif.

Michiana Chapter

Hears Talk on Core Processes

■ Advantages and disadvantages of current core processes were outlined to chapter members in October by A. Dorfmueller, Jr. Archer-Daniels-Midland Co., Cleveland. Oil-sand, resin-bonded sand, hollow shell, air-setting, CO_2, reactive gas and green cap processes were illustrated with slides.

Dorfmueller stated that no one process is the best for every application and recommended that foundrymen determine which process was best suited for their particular needs. —*Walt Ostrowski*

Personalities

Central New York Chapter

Hears Non-Destructive Testing Talk

■ Geometric, mechanical, electrical, thermal, reflection and structural properties of castings can be measured through non-destructive testing, W. C. Wheadon, Syracuse University Research Institute, Syracuse, N. Y., explained to members at the October meeting.

The four most important current non-destructive methods were listed as radiograph (x-ray); magnetic particle; flourescent particle (ultra-violet); and ultrasonic. Radium capsules and cobalt-60 methods of testing were cited as increasingly popular radiographic methods.—*C. W. Diehl*

Chesapeake Chapter

Hears Talk on Taconite

■ Chesapeake's 1958-59 technical season opened in September with a talk on the *Taconite Process* by Roger Batchelor, Pickands Mather & Co. Chapter Chairman William O. Becker, Atlantic Abrasive Corp., South Braintree, Mass., presided. G. A. D'Andreas, Arlington Bronze & Aluminum Corp., Baltimore, Md., served as technical chairman.—*D. A. Roemer*

Chapter News

afs | chapter meetings

DECEMBER

Birmingham District . . *No Meeting.*

Canton District . . **Dec. 4** . . Mergus Restaurant, Canton, Ohio. . . H. J. Weber, AFS, *"Recent Air Pollution Legislation Affecting Foundries."*

Central Illinois . . **Dec. 13** . . American Legion Hall, Peoria, Ill. . . *Annual Christmas Party.*

Central Indiana . . **Dec. 1** . . Athenaeum Turners Hall, Indianapolis . . W. W. Levi, Lynchburg Foundry Co., *"What You Should Know About Cupola Operation."*

Central Ohio . . **Dec. 8** . . Seneca Hotel, Columbus, Ohio . . F. S. Catlin, Magnaflux Corp.

Chesapeake . . **Dec. 5** . . Engineers' Club, Baltimore, Md. . . G. O. Pfaff, Wheelabrator Corp., *"Reducing Blast Cleaning Costs."*

Chicago . . **Dec. 1** . . Chicago Bar Association, Chicago . . *Gray Iron Group*: D. Matter, Ohio Ferro-Alloys Corp., *"The Role of Ductile Iron in the Foundry Industry"*; *Non-Ferrous Pattern Group*: J. Biele, Illinois Precise Casting Co., *"Investment Castings"*; *Steel, Maintenance Group*: H. F. Bishop, Exomet, Inc., *"Design, Gating & Risering Problems Related to X-ray or Magnaflux Standards;" Malleable Group*: R. L. Doelman, Miller & Co., *"Design & Operation of a Slurry System & Its Benefits."*

Cincinnati District . . **Dec. 20** . . Netherlands Hilton Hotel, Cincinnati . . *Christmas Dinner Dance.*

Connecticut . . *No Meeting.*

Detroit . . *No Meeting.*

Eastern Canada . . **Dec. 12** . . Mount Royal Hotel, Montreal, Que. . . *Steel Group*: L. N. McEntush, Canadian Unitcast Steel Ltd., and R. Desilets, Sorel Steel Foundries; *Non-Ferrous Group*: A. E. Cartwright, Crane Ltd., and R. Woods,

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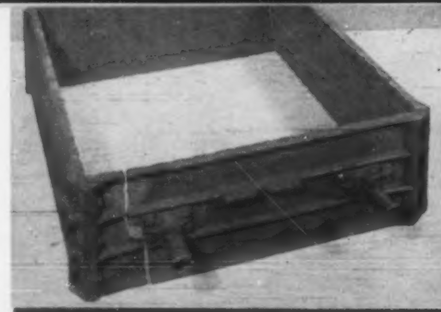

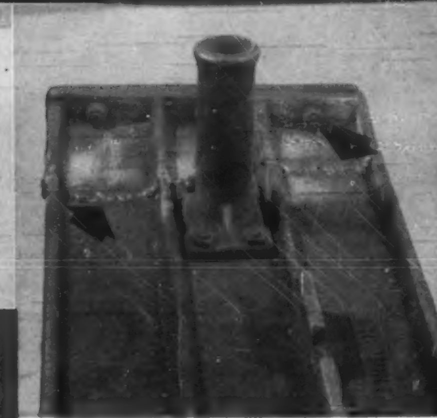

Fig. 11 . . . Fractured flask (above) before restored to useful service by weld repair; weld is at right.

Repair Welding

Continued from page 28

muller plow blade operates. The remarkable service life makes the economics of this wear-resistant overlay procedure self-evident.

Figure 6 illustrates on the left a worn bronze shoe belonging to a Michigan foundry. On the right this shoe is shown after having been rebuilt with an electrode which deposits at low base metal heat, a wear-resistant copper-aluminum-chromium alloy. Field reports indicate that the rebuilt shoes outwear a new shoe six to one.

Other opportunities for wear-resistant overlays are sand slinger heads, sand blasting cabinets, wheelabrator parts, muller wheels, conveyor parts, sand conditioning equipment, crane rails and bucket teeth.

While it may sound minor, chisels are used in such quantity in many foundries that their cost can be substantial. A super-service chisel can be made in a matter of minutes from a piece of steel by electrode deposition of shock and impact-resisting metal on one end. This deposit is heat treatable and has high red retention qualties (the opposite of "red shortness").

The alloy deposited by this electrode has a Rockwell C62 hardness at room temperature, 59 at 900F, and 56 at 1100F. High-speed steel, 18W-4Cr-1Va, is only 51 Rockwell C at 1100F.

It is particularly suited for repairing foundry machine shop cutting tools. For instance, a core rod cutting blade can be made simply by surfacing an inexpensive, plain carbon steel bar with the alloy.

Cutting–Piercing–Gouging

Time-saving tools for any foundry maintenance department are special oxygen-less electrodes designed for 1) cutting and piercing; and 2) for chamfering, gouging, or removing unwanted metal. These metal-working electrodes are used with any standard arc-welding machine and require no special equipment. The rods have special exothermic coatings which are consumed more slowly than the core wire, spearheading the arc to a pinpoint. These coatings are heat resisting and contain chemicals which produce a gas of remarkable velo-

Fig. 12, 13 . . . Aluminum welding has been simplified. Cast-aluminum flask (right), broken in two spots, shown below after it was repaired with four electrodes in 22 min.

city when melted. The gas literally blasts the metal away. The electrodes perform even on metals which do not respond to the phenomena of oxidation, making them suitable for cast iron, stainless steel, and aluminum.

A large flask often requires holes drilled at intervals to allow gas to escape. Many holes can be made rapidly with one of these cutting electrodes in less time than it would take to transport the flask to a drill press.

Figure 7 shows an aluminum match plate which fractured in service. This crack has been beveled for welding with a gouging electrode in a small fraction of the time grinding would have required. Gouging out a crack in a ladle bottom and removing a broken weld on shakeout machine grates are other typical applications.

Figure 8 illustrates a cast iron flask which has fractured. Figure 9 shows the crack after electrode beveling. Figure 10 illustrates the flask after repairing with nickel-bearing cast iron electrode designed for high strength, crack-free joining of cast iron without preheat. Figures 11 and 11A illustrate another cast iron flask before and after restoring to useful service by weld repair.

Repairing Aluminum

Aluminum is generally considered difficult to weld. This conception is now obsolete since new techniques have simplified aluminum joining to a point that it is not beyond the skill of any mechanic who is familiar with welding equipment.

The simplicity of application is the result of a low melting core wire with a unique extruded flux coating. The cast aluminum flask in Fig. 2 was broken in two areas. Figure 13 shows repaired flask 22 min. and four electrodes later.

Match plates with broken areas of missing metal are shown in Fig. 14 and are rebuilt in Fig. 15. This technique can be utilized for restoring aluminum patterns, core boxes, fans in electric motors and power tool housings.

It is hoped that the economies suggested in this article will stimulate thinking in the direction of savings by focusing attention toward the often overlooked possibilities of foundry welding.

Fig. 14, 15 . . . Match plates (left) with broken pieces of metal from ends, shown below after foundry weld repair.

chapter meetings

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Montreal Bronze Ltd.; *Cast Iron Group*: L. Fortin, Canada Iron Foundries Ltd. and F. Machnik, Dominion Engineering Works. *Round Table Discussion Groups.*

Eastern New York . . **Dec. 16** . . Panetta's Restaurant, Menands, N. Y. . . *Annual Christmas Party.*

Metropolitan . . **Dec. 12** . . Essex House, Newark, N. J. . . *Annual Christmas Party.*

Mexico . . *No Meeting.*

Michiana . . **Dec. 8** . . Club Normandy, Mishawaka, Ind. . . R. W. Slack, Federal Machinery Sales Co., *"Use of Plastics in the Foundry."*

Mid-South . . **Dec. 13** . . Claridge Hotel, Memphis, Tenn. . . *Annual Christmas Party.*

New England . . **Dec. 10** . . University Club, Boston.

Northeastern Ohio . . **Dec. 5** . . Tudor Arms Hotel, Cleveland . . *Christmas Stag Party.*

Northern California . . **Dec. 15** . . Spenger's Restaurant, Berkeley, Calif. . . *Casting Clinic.*

Northern Illinois & Southern Wisconsin . . **Dec. 6** . . Faust Hotel, Rockford, Ill. . . *Annual Christmas Party.*

Northwestern Pennsylvania . . **Dec. 6** . . Siebenbuerger's Club, Erie, Pa. . . *Annual Christmas Party.*

Ontario . . **Dec. 12** . Royal Connaught Hotel, Hamilton, Ont. . . W. B. Bishop, Archer-Daniels-Midland Co., *"Which Core Process?"*

Oregon . . *No Meeting.*

Philadelphia . **Dec. 11** . . Sheraton Hotel, Philadelphia . . *Annual Christmas Party.*

Piedmont . . *No Meeting.*

Pittsburgh . . **Dec. 15** . . Webster Hall Hotel, Pittsburgh, Pa. . . *Annual Christmas Party.*

Quad City . . **Dec. 12** . . Blackhawk Hotel, Davenport, Ia. . . *Annual Christmas Party.*

Rochester . . **Dec. 2** . . Manger Hotel, Rochester, N. Y. . . H. J. Weber, AFS, *"Occupational Loss of Hearing Due to Noise—A New Foundry Problem."*

Saginaw Valley . . **Dec. 4** . . Fischer's Hotel, Frankenmuth, Mich. . . S. C. Massari, AFS, *"Structure and Physical Properties of Metals."*

St. Louis District . . Dec. 11 . . Edmond's Restaurant, St. Louis . . A. H. Homberger, International Automation Corp., *"The Buhrer Automated Molding & Pouring Method."*

Southern California . . Dec. 12 . . Rodger Young Auditorium, Los Angeles . . *"Foundry Education in the School."*

Tennessee . . *No Meeting.*

Texas . . Dec. 5 . . College Station, Texas . . J. H. Kimes, Lufkin Foundry & Machine Co., *"Ferrous Metallurgy," with Student Chapter of Texas A & M as Hosts.*

Texas, San Antonio Section . . Dec. 15 . . Alamo Iron Works, San Antonio, Texas.

Timberline . . Dec. 8 . . Oxford Hotel, Denver, Colo.

Toledo . . Dec. 3 . . Heather Downs Country Club, Toledo, Ohio . . H. Von Wolff, Shalco Corp, *"Shell Molding & Coremaking."*

Tri-State . . Dec. 13 . . Mayo Hotel, Tulsa, Okla. . . *Annual Christmas Party.*

Twin City . . Dec. 13 . . Calhoun Beach Hotel, Minneapolis . . *Annual Christmas Party.*

Utah . . Dec 3 . . Covey Hot Shoppes, Salt Lake City . . A. Dorfmueller, Jr., Archer-Daniels-Midland Co., Federal Foundry Supply Div.

Washington . . Dec. 6 . . Town & Country Club, Seattle . . *Annual Christmas Party.*

Western Michigan . . Dec. 1 . . Bill Stern's Restaurant, Muskegon, Mich. . . C. A. Sanders, American Colloid Co., *"Some Causes of Scrap."*

Western New York . . Dec. 5 . . Hotel Sheraton, Buffalo, N. Y. . . H. Von Wolff, Shalco Corp., *"Development of Shell Core Process."*

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JANUARY

Birmingham District . . Jan. 9 . . Tutwiler Hotel, Birmingham, Ala. . . J. S. Vanick, International Nickel Co, *"The Casting—Iron, Steel, Brass." Management Night.*

Canton District . . Jan. 8 . . Elks Club, Barberton, Ohio . . C. K. Donoho, *"Ductile (Nodular) Iron."*

Central Illinois . . Jan. 5 . . American Legion Hall, Peoria, Ill. . . J. E. Stock, John Deere Waterloo Tractor Works, *"Shell Cores."*

Central Indiana . . Jan. 5 . . Athenaeum, Indianapolis . . *Panel:* K. A Mierické,

modern castings

FOUNDRY FACTS NOTEBOOK

FUNDAMENTALS OF MOLDING—II

by A. D. Barczak
Superior Foundry, Inc.
Cleveland

Foundry Facts Notebook *is designed to bring you practical down-to-earth information about a variety of basic foundry operations. As the name implies, this page is prepared for easy removal and insertion into a notebook for handy future reference.—Editor*

In making molds, flasks should be selected so that sufficient room between pattern and flask is allowed for gates, risers, etc. There also must be enough space provided for sand over and under the pattern to prevent danger of the metal breaking out or straining the mold. The best policy is to err on the side of safety and choose a flask size too large for a job rather than too small.

For a split pattern, two smooth rigid bottomboards should be obtained for making the mold. These boards should be large enough to extend to the outside edges of the flasks and preferably a few inches beyond.

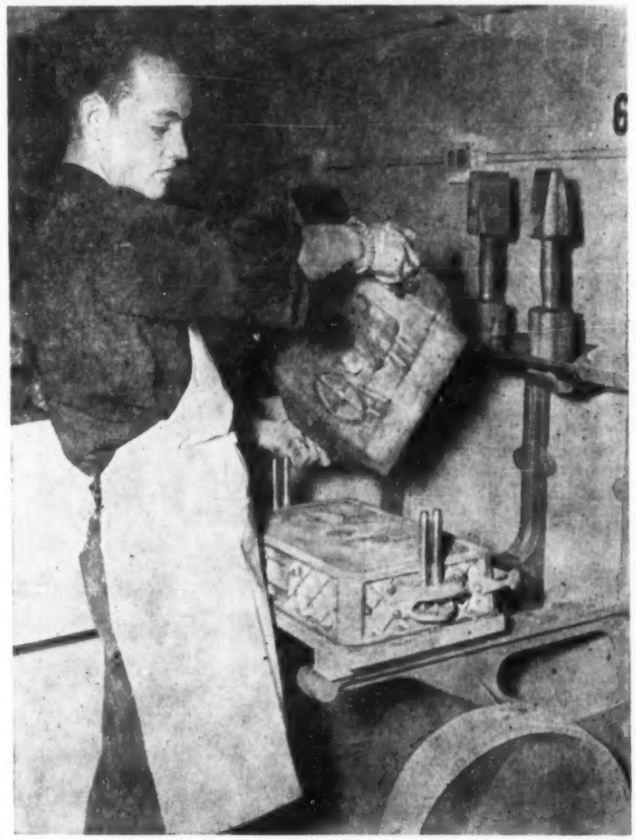
All adhering sand, oil or grease should be cleaned from the pattern to be used and it should be checked thoroughly to make certain that all loose pieces work freely, but seat securely.

Facing Sand Use

When using a split pattern, the lower half of the pattern is placed joint down on the bottomboard. Next, the facing sand is riddled to a depth of 1/2 to 1 inch on the pattern and mold joint. Riddling is absolutely necessary for good reproduction of the pattern. The riddled sand is then tucked into all pockets or sharp corners and hand packed around the pattern.

Backing sand is then put into the flask, covering the facing sand to a depth of 3 or 4 inches. Ram well by means of a hand or pneumatic rammer, taking care to avoid hitting the pattern or even coming too close to it. The mold must be rammed to a uniformly hard condition in order to obtain a smooth, easily cleaned casting surface and to make uniform contact over the surface.

This flask section is now clamped between the two boards and is



turned over. The bottom-board, now on top, is removed and the mold face is cleaned and slicked.

Ramming Cope

The cope half of the pattern is then properly placed on the drag half. The cope flask section is located and held in place by pins inserted in the cope and drag flask to avoid metal penetration into the sand, swelling, break-outs, etc.

When this ramming is completed, 5 or 6 more inches of sand are added at a time and rammed until the flask is filled to a point about an inch above the top of the flask.

Next, the excess sand is struck-off, by means of a strike. The bottomboard is placed in position and then removed to ascertain that it has full bearing on sand and flask. If it does not have a full bearing, sand is spread on the low areas pin fittings. The cope flask section should be reinforced with bars, which support the gaggers and also help resist the tendency of the molten metal to strain, or push-up the sand in the cope.

After the properly supported cope flask section is placed in position a parting material (which prevents the sand in cope and drag from sticking together when cope is rammed) is sprinkled over the mold joint.

The facing sand is then applied,

as in ramming of the drag. After it is packed by hand, the gaggers are set in place. Care should be used not to ram gaggers down into contact with the pattern. This would cause trouble when the mold was poured due to the gagger fusing to the casting or causing sand surface defects.

The sprue stick is placed in the proper position. Facing sand is packed by hand around it and also around the risers. This packing of facing sand may have to be done after the ramming of each layer of backing sand and prior to the placing of the next layer, if the cope section is deep.

The cope flask is then filled in the same manner as the drag section. Before striking the sand from the mold, the sprue stick, vent rods, riser patterns, etc. are drawn. The cope flask section is then removed, and depending on its size may be rolled over, or set on its side.

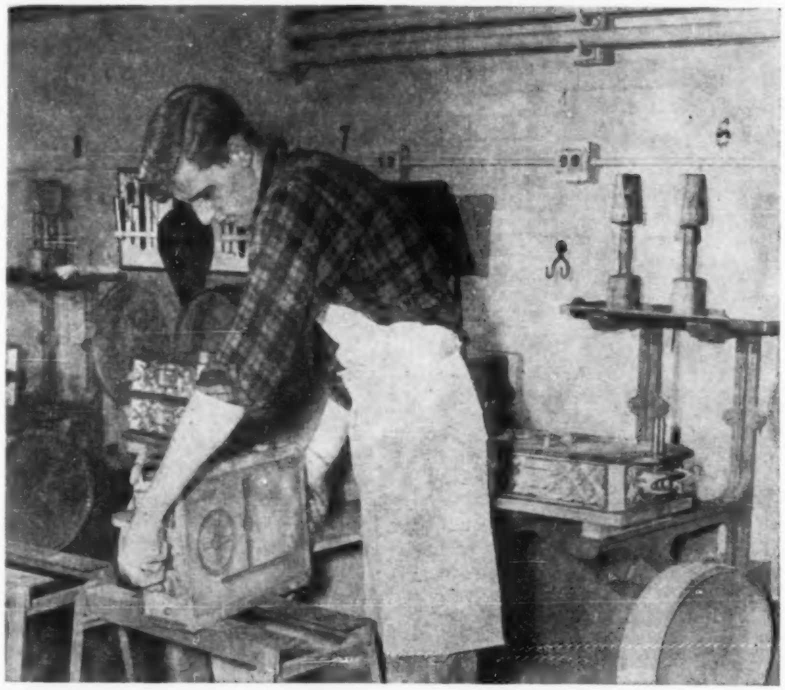
Drawing Pattern

Again depending on size and design, the pattern may be lifted in the cope half, or it may remain on the drag half. In either case, the cope and drag sections of the pattern are drawn and the mold is cleaned and slicked. At this time all sharp corners or projecting fins of sand should be removed. If allowed to remain they will be sources of cracks, shrinks and dirt.

Once the mold sections have been properly finished, the ingates and runners cut, the cores should be set in place. After cores have been set, provision must be made for the venting of core and mold to allow escape of gases. There is no point in venting the cores if these same vents are not continued through the mold. All loose sand must be removed from gate, riser and casting cavities.

Once cores have been set, cope mold is placed on the drag, clamped together and poured as soon as practicable. Molds that are allowed to stand for prolonged periods after closing usually produce inferior castings.

Molds should be clamped only when closing pins are in place to avoid shifting the flask sections while driving wedges under the clamps. It is always wise to use more clamps than appear necessary rather than less. It is absolutely necessary that the flask sections be held securely together to prevent metal run-outs.



After the molds are closed, they should not be moved until they have been poured. Moving, no matter how carefully done, will shift flask sections and cores, and loosen sand on mold faces, resulting in faulty castings.

Avoid handling molds roughly, or more than necessary, in any stage of their manufacture. It must be remembered that green sand and skin-dried molds are essentially plastic masses at all times. Dry sand molds, although able to withstand rougher handling, do distort in drying. Any handling serves to aggravate this distortion.

■ Abstract from a talk presented at 1958 Wisconsin Regional Foundry Conference.

Baroid Div., National Lead Co.; E. E. Wene, Link-Belt Co.; C. M. Eberhardt, Central Foundry Div., GMC; J. D. Sickmann, Swayne, Robinson Co.; *Moderator:* D. Lunsford, Perfect Circle Corp., *"What's New in Foundry Sands." National Officers' Night.*

Central New York . . Jan. 9 . . Drumlins Country Club, Syracuse, N. Y.

Chicago . . Jan. 5 . . Chicago Bar Association, Chicago . . J. B. Caine, Consultant, *"Casting Design."*

Connecticut . . Jan. 9 . . Waverly Inn, Cheshire, Conn. . . *Holiday Party* . . **Jan. 27 . .** Waverly Inn, Cheshire, Conn. . . *Round Table.*

Eastern Canada . . Jan. 9 . . Sheraton Mt. Royal Hotel, Montreal, Que. . . R. L. McIlvaine, National Engineering Co., *"Foundry Mechanization."*

Metropolitan . . Jan. 5 . . Essex House, Newark, N. J. . . H. J. Heine, Malleable Founders' Society, *"Casting Quality & Properties as Influenced by Design."*

Mid-South . . Jan. 9 . . Claridge Hotel, Memphis, Tenn. . . A. E. Tull, Air Reduction Sales Co., *"The Calcium Carbide Injection Process."*

Northeastern Ohio . . Jan. 8 . . Tudor Arms Hotel, Cleveland . . J. A. Babcock, Pickands Mather & Co., *"Taconite."*

Philadelphia . . Jan. 9 . . Engineers' Club, Philadelphia . . R. B. Fischer, Ingersoll-Rand Co, *"Factors That Influence Gating & Risering."*

Piedmont . . Jan. 9 . . Hotel Poinsetta, Greenville, S. C. . . C. V. Nass, Beardsley & Piper Div., Pettibone Mulliken Corp., *"Mechanization for the Small Foundry."*

Rochester . . Jan. 6 . . Manger Hotel, Rochester, N. Y. . . J. F. Roth, Cleveland Standard Pattern Works, *"The Patternmaker's Application of Plastic in Industry."*

Saginaw Valley . . Jan. 8 . . Fischer's Hotel, Frankenmuth, Mich. . . H. J. Weber, AFS, *"Control of Foundry Noise."*

St. Louis District . . Jan. 8 . . Edmond's, St. Louis . . R. A. Witschey, A. P. Green Fire Brick Co., *"Fundamentals of Refractories."*

Southern California . . Jan. 9 . . Rodger Young Auditorium, Los Angeles . . C. A. Sanders, American Colloid Co., *"Casting Finish, Precision & Tolerance."*

Tri-State . . Jan. 9 . . Tulsa, Okla. . . E. J. Boywid, International Harvester Co., *"Safety & Hygiene in the Foundry."*

Toledo . . Jan. 7 . . Heather Downs Country Club, Toledo, Ohio . W. A. Mader, Oberdorfer Foundries, Inc., *"CO_2 Experience in Non-Ferrous Foundry."*

Western Michigan . . Jan. 5 . . Schuler's, Grand Haven, Mich.

Dr. J. T. MacKenzie, AFS Director, (1951-54), Dies

■ Dr. James T. MacKenzie, retired technical director, American Cast Iron Pipe Co., Birmingham, Ala., died Nov. 17. He was a nationally known metallurgical authority.

In 1947, he was elected a director of the company, the position he held at the time of his retirement in 1956. Following his retirement, MacKenzie served the Southern Research Institute, Birmingham, as consultant.

J. T. MacKenzie

He was made an honorary life member of AFS in 1938, having received the Whiting Metal in 1937. He was elected to the AFS board of directors in 1951. Active for many years in AFS technical committees, he was a member, AFS Birmingham Chapter. At the AFS Convention in 1947, he delivered the Hoyt Lecture, speaking on *Cupola Melting Practice*. He was a director, American Society for Metals.

Pangborn Corp. President, Victor F. Stine, is Dead

■ Victor F. Stine, president, Pangborn Corp., Hagerstown, Md., died Oct. 29. He was a member of AFS for over 30 years and spent over 45 years in the blast cleaning business, all with the Pangborn Corp.

He started as an accountant, and progressed steadily through the positions of auditor, assistant treasurer, assistant secretary, secretary, vice-president, vice-president in charge of sales and engineering and was elected president in February, 1957.

Stine was elected a director of AFS in 1953 and is a past director, AFS Chesapeake Chapter. He was also a past-director, Foundry Equipment Manufacturers' Association.

classified advertising

For Sale, Help Wanted, Personals, Engineering Service, etc., set solid . . 25c per word, 30 words ($7.50) minimum, prepaid.

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For well-known, progressive foundry in Up-State New York producing steel, gray iron and non-ferrous castings. Must be capable of supervising 12 men for maximum efficiency and have complete knowledge of rigging equipment for blowing cores and making shell cores. Must be capable of reading blue prints and estimating core production. Must also be well versed in the production of oil sand as well as CO_2 cores. Excellent opportunity for right man. Write giving full details of personal background, past experience and salary expected. **Box E-50, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

YOUNG FOUNDRY METALLURGIST. Should have received his degree within the past several years. An excellent opportunity to train under an experienced metallurgist leading to a position of responsibility in operations. Production malleable foundry located in the Midwest. Write giving details of experience, availability, salary and other requirements. **Box E-55, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

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Expanding sales coverage requires additional working capital and active manager. Excellent growth potential. Squeezers and rollover for sand; permanent mold; shell.
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LEADING FOUNDRY SUPPLY COMPANY, selling both supplies and equipment, require the services of an energetic sales representative to cover the states of Virginia, North Carolina and South Carolina. Looking for man with foundry experience and sales ability. Good opportunity for the right man. **Box E-52, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

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FOUNDRY Design Engineer

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CHIEF MANUFACTURING ENGINEER stainless steel foundry. Must be experienced in industrial engineering, methods, engineering and tool engineering. Reporting to vice-president manufacturing. Write in complete confidence to: **BOX E-56, MODERN CASTINGS, Golf and Wolf Roads, Des Plaines, Ill.**

Wanted to Buy

BACK VOLUMES — Wanted to buy for cash of foundrymen, TRANSACTIONS American Foundrymen's Society and other scientific technical Journals, **A. S. ASHLEY 27 E. 21, N. Y. 10, N. Y.**

WANTED! BOUND VOLUMES OF TRANSACTIONS OF AFS. Arrangements to sell bound volumes of TRANSACTIONS of AFS, intact and in good condition, may be made through AFS Headquarters. Those who have no further use for any volumes of TRANSACTIONS on their bookshelves are requested to communicate with the **Book Department, American Foundrymen's Society, Golf and Wolf Roads, Des Plaines, Illinois.**

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MODERN CASTINGS announces a new service available to all members of the American Foundrymen's Society. Any member seeking employment in the metal-castings business may place one classified ad of 40 words in the "Positions Wanted" column FREE OF CHARGE.
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Golf and Wolf Roads, Des Plaines, Illinois

Key to Abbreviations

bonus	bonus section
er	editor's report
ffn	foundry facts notebook
q&a	questions & answers
shape	the SHAPe of things
trans	transactions

advertisers and their agencies

This index is published as a convenience to the readers. While every care is taken to make it accurate MODERN CASTINGS assumes no responsibility for errors or omissions.

At Grinnell, molten iron is poured from air furnaces 16 hours a day (above) to produce over 2,000 different types and sizes of castings like those shown at right.

Grinnell uses HANNA SILVERY at their Columbia, Pa., plant to help maintain close silicon control

Grinnell Corporation is nationally known for its automatic sprinkler systems—a line relied on for dependable fire protection by thousands of American businesses. For these systems, and for its piping supply sales throughout the country, Grinnell at its Columbia, Pa., plant annually produces over 100 million malleable iron castings of uniform quality and dependability—pipe fittings, pipe hangers and supports from 1/8" I.D. elbows to 6" I.D. tees.

Every one of more than 2,000 patterns, many of them intricate, is cast from the same mixture. An all-important part of this mixture is Hanna Silvery Pig Iron. Grinnell metallurgists have found that Hanna Silvery, with its dependable analysis, gives them the silicon control so essential to the uniform qualities required in sprinkler systems and pipe fittings.

In addition to Silvery, Hanna produces all regular grades of pig iron, including HannaTite, a specially controlled close-grain iron. All are available in the popular 38-pound pig and the smaller HannaTen ingot.

Ask your Hanna representative how he can help solve your pig iron problems. He is an expert and as close as your telephone.

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Buffalo • Detroit • New York • Philadelphia
Merchant Pig Iron Division of
NATIONAL STEEL CORPORATION

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modern castings

modern castings, december, 1958